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[ENDANGERED AND THREATENED SPECIES
OF THE SOUTHEASTERN UNITED STATES
INCLUDING PUERTO RICO AND THE VIRGIN ISLANDS]

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Revised July 1982

U.S. DEPT. OF AGRICULTURE
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NOV 22 1982

CATALOGING = PREP.

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List of threatened, endangered and sensitive plant species of Southeastern United States arranged alphabetically by scientific name.

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number†</u>
<i>Abronia macrocarpa</i>	Large-fruited sand-verbena	Nyctaginaceae	TX	UR	
<i>Abutilon commutatum</i>	Puerto Rico abutilon	Malvaceae	PR	SR-E(3B)	
<i>Abutilon virginiana</i>	Virgin Island abutilon	Malvaceae	PR VI Brit. VI	UR	
<i>Acacia emoryana</i>	Emory acacia	Fabaceae	TX	SR-E(3B)	
<i>Acer grandidentatum</i> var. <i>sinuosum</i>	Uvalde bigtooth maple	Aceraceae	TX	UR	
<i>Acleisanthes crassifolia</i>	Texas crumpets	Nyctaginaceae	TX	UR	
<i>Aeschynomene virginica</i>	Sensitive joint-vetch	Fabaceae	DE MD NC NJ PA VA	UR	
<i>Agalinis caddoensis</i>	Caddo parish false-foxglove	Scrophulariaceae	LA	UR	
<i>Agalinis pseudophylla</i>	false leaved false-foxglove	Scrophulariaceae	AL LA MS TN	UR	304
<i>Agalinis purpurea carteri</i>	Carter's large purple false-foxglove	Scrophulariaceae	FL	UR	
<i>Agalinis stenophylla</i>	narrow-leaved false-foxglove	Scrophulariaceae	FL	UR	
<i>Agave chisoensis</i>	Chisos agave	Liliaceae	TX	UR	
<i>Agave eggersiana</i>	Eggers' agave	Liliaceae	VI	UR	

* / Federally listed species include threatened (T), endangered (E), proposed threatened (PT), and proposed endangered (PE). Sensitive species include species currently under consideration for listing by the U.S. Fish and Wildlife Service (UR) and those additional species listed by the Smithsonian Institution as threatened (SR-T), endangered (SR-E) or extinct (SR-EX). The () are those currently dropped by the U.S. Fish & Wildlife Service, i.e., 3A=Service has persuasive evidence of extinction; 3B=taxonomic synonyms of a widespread species; 3C=taxa to widespread & not subjected to identifiable threats; a None=not on any National list.

† / a=both species description management guide and field card published; b=field card only, no subscript, is management guide only.

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
<i>Agrimonia incisa</i>	incised groove bur	Rosaceae	FL MS SC	UR	302
<i>Aletes filifolius</i>	narrow-leaved aletes	Apiaceae	NM TX	SR-T(3C)	
<i>Allium perdulce</i> var. <i>sperryi</i>	Sperry's onion	Liliaceae	TX	None (3C)	
<i>Allowissandula holosericea</i>		Malvaceae	TX	None (3C)	
<i>Alnus maritima</i>	sea-side alder	Betulaceae	DE MD OK	SR-T(3C)	
<i>Alsophila brooksii</i>	Brook's tree fern	Cyatheaceae	PR Cuba, Hispaniola	UR	
<i>Alsophila dryopteroides</i>	Helecho	Cyatheaceae	PR	UR	
<i>Ambrosia cheiranthifolia</i>	Gray's ragweed	Asteraceae	TX Mexico	UR	
<i>Amoreuxia wrightii</i>	Wright's yellowshow	Cochlospermaceae	TX Mexico	SR-T(3C)	
<i>Amorpha quachitensis</i>	Quchita Mountain indigobush	Fabaceae	AR OK	UR	
<i>Amorpha roemerana</i>	hill country indigobush	Fabaceae	TX	UR	
<i>Amorpha texana</i>	Texas indigobush	Fabaceae	TX	None (3B)	
<i>Amphianthus pusillus</i>	little amphianthus	Scrophulariaceae	AL GA SC	UR	200
<i>Amsonia glaberrima</i>	hairless blue-star	Apocynaceae	LA TX	UR	
<i>Amsonia repens</i>	creeping blue-star	Apocynaceae	TX	UR	
<i>Amsonia tabernae</i> <i>montanum gattingeri</i>	Eastern blue-star	Apocynaceae	TN	UR	
<i>Amsonia tharpii</i>	Tharp's blue-star	Apocynaceae	TX	UR	
<i>Ancistrocactus tobuschii</i>	Bandera county ancistrocactus	Cactaceae	TX	E	
<i>Andrachne arida</i>	desert buck-brush	Euphorbiaceae	TX	UR	
<i>Andropogon arctatus</i>	pine-woods bluestem	Poaceae	AL FL	SR-E(3C)	183
<i>Anemone edwardsiana</i> var. <i>edwardsiana</i>	Edward's plateau anemone	Ranunculaceae	TX	SR-T(3C)	

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Anemone edwardsiana var. petraea	glaborous-seeded plateau anemone	Ranunculaceae	TX	UR	
Anemone minima		Ranunculaceae	VA WV	None(3)	
Anguria cookiana	Cook's gourd	Cucurbitaceae	PR	UR	
Anthericum chandleri	Chandler's anthericum	Liliaceae	TX Mexico	UR	
Antirhea portoricensis	Quina	Rubiaceae	PR	UR	
Apios priceana	Price's groundnut	Fabaceae	AL IL KY MS TN	UR	33
Aquilegia canadensis australis	southern columbine	Ranunculaceae	FL	UR	189
Aquilegia chaplinei	McKittrick columbine	Ranunculaceae	NM TX	UR	
Aquilegia hinckleyana	Hinckley's columbine	Ranunculaceae	TX	UR	
Arabis georgiana	Georgia rock-cress	Brassicaceae	AL GA	UR	
Arabis perstellata ampla	large prairie rock-cress	Brassicaceae	TN	UR	42A
Arabis perstellata perstellata	small prairie rock-cress	Brassicaceae	KY	UR	41B
Arabis petiolaris	Brazos rock-cress	Brassicaceae	TX	None(3C)	
Arenaria alabamensis	Alabama sandwort	Caryophyllaceae	AL NC	UR	49
Arenaria cumberlandensis	Cumberland sandwort	Caryophyllaceae	TN	UR	269
Arenaria fontinalis	Pioneer sandwort	Caryophyllaceae	KY TN	UR	19
Arenaria livermorensis	Livermore sandwort	Caryophyllaceae	TX	UR	
Argythamnia aphoroides	Hill county wild-mercury	Euphorbiaceae	TX	UR	
Argythamnia argyraea	silver wild-mercury	Euphorbiaceae	TX	SR-E (3C)	
Argythamnia blodgettii	Blodgett's wild-mercury	Euphorbiaceae	FL	UR	

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<i>Aristida floridana</i>	Florida three-awned grass	Poaceae	FL	UR	
<i>Aristida portoricensis</i>	Puerto Rico three-awned grass	Poaceae	PR	UR	
<i>Aristida simpliciflora</i>	southern three-awned grass	Poaceae	AL FL MS	UR	
<i>Asclepias viridula</i>	southern milkweed	Asclepiadaceae	FL	UR	2
<i>Asimina tetramera</i>	opposum pawpaw	Annonaceae	FL	UR	108 ^a
<i>Asplenium ebennoides</i>	Scott's spleenwort	Polypodiaceae	AL AR CT IL NJ OH PA TN VA WV	None (3B)	
<i>Asplenium heteroresiliens</i>	Wagner's spleenwort	Polypodiaceae	FL GA NC SC	UR	
<i>Asplenium kentuckiensis</i>	Kentucky spleenwort	Polypodiaceae	AR IL IN KY OH VA	None(3B)	
<i>Asplenium plenum</i>	double spleenwort	Polypodiaceae	FL	UR	
<i>Aster avitus</i>	Alexander's rock aster	Asteraceae	GA SC	UR	261
<i>Aster brachypholis</i>	Apalachicola River aster	Asteraceae	FL	UR	
<i>Aster furcatus</i>		Asteraceae	AR IL IN IA MO WI	UR	
<i>Aster pinifolius</i>	Pale-violet aster	Asteraceae	AL FL	SR-E(3B)	117
<i>Aster plumosus</i>	plumose aster	Asteraceae	FL	UR	103
<i>Aster scabrimaculis</i>	rough-stemmed aster	Asteraceae	TX	UR	
<i>Aster spinulosus</i>	pine-woods aster	Asteraceae	FL	UR	3
<i>Aster verutifolius</i>	Ocean Springs aster	Asteraceae	MS	SR-T(3B)	
<i>Astilbe crenatiloba</i>	Roan astilbe	Saxifragaceae	NC TN	UR	
<i>Astragalus mollissimus</i> marcidus	Maccid's woolly milkvetch	Fabaceae	TX	UR	
<i>Astragalus tennesseensis</i>	Tennessee milkvetch	Fabaceae	AL IL IN TN	UR	34

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Astranthium robustum	robust western-daisy	Asteraceae	TX	SR-T (3C)	
Atriplex klebergorum	Kleberg's saltbush	Chenopodiaceae	TX	SR-E (3C)	
Aureolaria patula	spreading foxgloves	Scrophulariaceae	AL GA KY TN	UR	305

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Bacopa simulans	Charles City water-hyssop	Scrophulariaceae	VA	SR-E (3B)	
Bacopa stragula	Mat Forming water-hyssop	Scrophulariaceae	MD VA	SR-E(3B)	
Bahia bigelovii	Bigelow bahia	Asteraceae	TX	UR	
Balduina atropurpurea	purple balduina	Asteraceae	FL GA MS SC	SR-E(3C)	102
Banara vanderbiltii	Vanderbilts' banara	Flacourtiaceae	PR	UR	
Baptisia arachnifera	hairy wild-indigo	Fabaceae	GA	E	55 ^a
Baptisia calycosa	pineland wild-indigo	Fabaceae	FL	UR	130
Baptisia hirsuta	hairy wild-indigo	Fabaceae	FL	UR	279
Baptisia megacarpa	Apalachicola wild-indigo	Fabaceae	AL FL	UR	229
Baptisia simplicifolia	coastal-plain wild-indigo	Fabaceae	FL	UR	56
Bartonia texana	Texas screwstem	Gentianaceae	TX	SR-E (3C)	
Basiphyllaea angustifolia		Orchidaceae	PR Cuba Hispaniola	UR	
Batesimalva violacea	purple gay-mallow	Malvaceae	TX Mexico	UR	
Berberis swaseyi	Texas barberry	Berberidaceae	TX	SR-T(3C)	
Betula uber	Virginia round-leaf birch	Betulaceae	VA	E	217
Boerhavia mathisiana	Mathison's spiderling	Nyctaginaceae	TX	UR	
Bonamia grandiflora	large-flowered bonamia	Convolvulaceae	FL	UR	22
Bothriochloa exaristata	awnless bluestem	Poaceae	LA TX	UR	
Brachionidium ciliolatum	fringed brachionidium	Orchidaceae	PR	UR	

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<i>Brassia caudata</i>	long-tailed spider orchid	Orchidaceae	FL Cent. Amer., Mexico, South Amer., West Indies	UR	
<i>Brazoria pulcherrima</i>	Centerville brazosmint	Lamiaceae	TX	SR-E(3C)	
<i>Brickellia brachyphylla</i> var. <i>hinckleyi</i>	Hinkley's plume brickell-bush	Asteraceae	TX	UR	
<i>Brickellia brachyphylla</i> var. <i>terlinguensis</i>	terlingia plume brickell-bush	Asteraceae	TX	UR	
<i>Brickellia cordifolia</i>	Flyr's brickell-bush	Asteraceae	AL FL GA	UR	104
<i>Brickellia dentata</i>	leafy brickell-bush	Asteraceae	TX	SR-T (3C)	
<i>Brickellia eupatorioides</i> <i>floridana</i>	Florida thoroughwort Brickell-bush	Asteraceae	FL	UR	
<i>Brickellia leptophylla</i>	narrow-leaved brickell-bush	Asteraceae	TX Mexico	UR	
<i>Brickellia shineri</i>	Shiner's brickell-bush	Asteraceae	TX Mexico	UR	
<i>Brickellia viejensis</i>	Sierra Vieja brickell-bush	Asteraceae	TX	UR	
<i>Bromus texensis</i>	Texas brome-grass	Poaceae	TX	SR-T (3C)	
<i>Brongniartia minutifolia</i>	little-leaved brongniartia	Fabaceae	TX Mexico	UR	
<i>Brunfelsia portoricensis</i>	Puerto Rico lady-of-the- night	Solanaceae	PR	UR	
<i>Buckleya distichophylla</i>	common piratebush	Santalaceae	NC TN VA	UR	
<i>Bumelia thornei</i>	Thorn's false buckthorn	Sapotaceae	GA	UR	
<i>Buxus vahlii</i>	Vahl's boxwood	Buxaceae	PR VI Jamaica	UR	310 ^b
<i>Byrsonima horneana</i>		Malpighiaceae	PR	UR	
<i>Byrsonima ophiticola</i>		Malpighiaceae	PR	UR	

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<i>Cacalia diversifolia</i>	variable-leaved indian-plantain	Asteraceae	AL FL GA	UR	105
<i>Cacalia rugelia</i>	Rugel's indian-plantain	Asteraceae	NC TN	UR	209
<i>Caesalpinia brachycarpa</i>		Fabaceae	TX	UR	
<i>Caesalpinia culebrae</i>	smooth yellow nicker	Fabaceae	PR	UR	
<i>Caesalpinia drummondii</i>	dwarf nicker	Fabaceae	TX Mexico	SR-E (3C)	
<i>Caesalpinia monensis</i>	black nicker	Fabaceae	PR	SR-T(3B)	
<i>Caesalpinia portoricensis</i>	brown nicker	Fabaceae	PR	UR	
<i>Calamagrostis cainii</i>	Cain's reedgrass	Poaceae	TN	UR	
<i>Calamagrostis insperata</i>	Ofer hollow reedgrass	Poaceae	AR MO OH	UR	
<i>Calamagrostis porteri</i>	Porter's reedgrass	Poaceae	KY NY NC PA VA WV	SR-T (3C)	
<i>Calamintha ashei</i>	Ash's savory	Lamiaceae	FL GA	UR	88
<i>Calamintha dentatum</i>	toothed savory	Lamiaceae	FL GA	UR	89
<i>Calamovilfa arcuata</i>	cumberland reedgrass	Poaceae	OK TN	UR	146
<i>Calamovilfa brevipilis</i> var. <i>brevipilis</i>	common soft-haired reedgrass	Poaceae	NC NJ SC VA	UR	
<i>Calamovilfa brevipilis</i> var. <i>calvipes</i>	Virginia soft-haired reed-grass	Poaceae	VA	None(3B)	
<i>Calamovilfa curtissii</i>	Curtis' reedgrass	Poaceae	FL	UR	184
<i>Calliandra biflora</i>	two-flowered stick-pea	Fabaceae	TX Mexico	SR-E(3C)	
<i>Callicarpa ampla</i>	large beautyberry	Verbenaceae	PR VI	UR	
<i>Callirhoe bushii</i>	Buch's woods poppy-mallow	Malvaceae	AR KS MO OK	UR	237

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Callirhoe scabriuscula	Texas poppy-mallow	Malvaceae	TX	E	
Calyptanthus luquillensis	luquillensis lidflower	Myrtaceae	PR	UR	
Calyptanthus peduncularis	stalked lidflower	Myrtaceae	PR	UR	
Calyptanthus thomasiana	Thomas's lidflower	Myrtaceae	PR	UR	
Calyptanthus triflorum	clover lidflower	Myrtaceae	PR	UR	
Calytronoma rivalis	creek calyprtonoma	Arecaceae	PR	UR	309 ^b
Campanula reverchonii	basin bellflower	Campanulaceae	TX	UR	
Campanula robiniae	Brooksville bellflower	Campanulaceae	FL	UR	
Canna pertusa	tattered canna	Cannaceae	FL PR	UR	
Cardamine longii	Long's bitter-cress	Brassicaceae	ME MD NY VA	UR	
Cardamine micranthera	piedmont bitter-cress	Brassicaceae	NC VA	UR	
Carex amplisquama	Fort Mountain sedge	Cyperaceae	GA	UR	23
Carex austrocaroliniana	southern appalachian sedge	Cyperaceae	GA NC SC TN	SR-T(3C)	
Carex baltzellii	Baltzell's sedge	Cyperaceae	AL FL	UR	24
Carex biltmoreana	Biltmore's sedge	Cyperaceae	GA NC SC	UR	223
Carex chapmanii	Chapman's sedge	Cyperaceae	FL NC SC VA	UR	25
Carex fissa	split sedge	Cyperaceae	OK	UR	
Carex latebracteata	Waterfall's sedge	Cyperaceae	AR OK	UR	224
Carex misera	wretched sedge	Cyperaceae	GA NC TN	SR-T(3C)	225
Carex onusta		Cyperaceae	TX	SR-T (3B)	
Carex purpurifera	purple sedge	Cyperaceae	AL GA KY NC TN	SR-T(3C)	26

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Carex roanensis	Roan Mountain sedge	Cyperaceae	TN	UR	
Carex socialis		Cyperaceae	IN KY IL MO TN	SR-T(3C)	
Cassia exunguis	tamarindillo senna	Fabaceae	PR	UR	
Cassia keyensis	Florida keys senna	Fabaceae	FL	UR	
Cassia mirabilis	Puerto Rico senna	Fabaceae	PR	UR	314 ^b
Cassia ripleyana	Ripley's senna	Fabaceae	TX	UR	
Castanea ozarkensis	Ozark chinquapin	Fagaceae	AR LA MO MS OK	UR	58
Castilleja ciliata	fringed indian-paintbrush	Scrophulariaceae	TX	UR	
Castilleja elongata	tall indian-paintbrush	Scrophulariaceae	TX	UR	
Castilleja ludoviciana	Jeff Davis paris indian-paintbrush	Scrophulariaceae	LA	UR	
Centrosema arenicola	sand butterfly pea	Fabaceae	FL	UR	
Cerastium clawsonii	fragrant wool-bearing	Caryophyllaceae	TX	SR-E(3B)	
Ceratophyllum floridana	Florida hornwort	Ceratophyllaceae	FL	SR-E(3B)	
Cereus eriophorus var. fragrans	fragrant wool-bearing cereus	Cactaceae	FL	UR	311 ^b
Cereus gracilis var. aboriginum	original prickly-apple cereus	Cactaceae	FL	UR	312 ^b
Cereus gracilis simpsonii	Simpson's prickly-apple	Cactaceae	FL	UR	
Cereus greggii	desert night-blooming cereus	Cactaceae	AZ CA NM TX Mexico	UR	

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<i>Cereus portoricensis</i>		Cactaceae	PR	UR	
<i>Cereus quadricostatus</i>		Cactaceae	PR	UR	
<i>Cereus robinii</i> <i>deeringii</i>	Deering's tree cactus cereus	Cactaceae	FL	UR	
<i>Cereus robinii</i> <i>robinii</i>	Robin's tree cactus cereus	Cactaceae	FL Cuba	UR	313 ^b
<i>Chaetopha hersheyi</i>	Guadalupe cliff daisy	Asteraceae	NM TX	UR	
<i>Chelone obliqua</i> var. <i>speciosa</i>	rose turtlehead	Scrophulariaceae	AR IL IN IA KY MI MN MO	SR-T (3C)	
<i>Chionanthus pygmaeus</i>	pygmy fringe-tree	Oleaceae	FL	UR	239
<i>Chloris texensis</i>	Texas windmill-grass	Poaceae	TX	UR	
<i>Chrysopsis cruiseana</i>	Cruise's golden-aster	Asteraceae	FL	UR	
<i>Chrysopsis floridana</i>	Florida golden-aster	Asteraceae	FL	UR	
<i>Chrysothamnus nauseosus</i> ssp. <i>texensis</i>	Texas ruber rabbit-brush	Asteraceae	NM TX	None (3B)	
<i>Cimicifuga rubifolia</i>	Appalachian bugbane	Ranunculaceae	AL IL KY TN VA	UR	151
<i>Cirsium turneri</i>	cliff thistle	Asteraceae	TX	UR	
<i>Cladrastis kentukea</i>	American yellow-wood	Fabaceae	AL AR GA IL IN KY MS MO NC OK SC TN	SR-T(3C)	
<i>Clematis addisonii</i>	Addison's leather-flower	Ranunculaceae	VA	SR-E(3C)	190
<i>Clematis albicoma</i>	white-haired leather-flower	Ranunculaceae	VA WV	None (3C)	
<i>Clematis gattingeri</i>	Gattinger's leather-flower	Ranunculaceae	AL TN	SR-E(3B)	
<i>Clematis micrantha</i>	old-man's beard	Ranunculaceae	FL	UR	244
<i>Clematis viticaulis</i>	grape leather-flower	Ranunculaceae	VA	UR	191

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<i>Cleome multicaulis</i>	many-stemmed spider-flower	Capparaceae	AZ CO NM TX WY Mexico	SR-E (3C)	
<i>Clitoria fragrans</i>	sweet-scented butterfly-pea	Fabaceae	FL	UR	230
<i>Clusia flava</i>	yellow balsam-apple	Hypericaceae	FL	UR	
<i>Coelorachis tuberculosa</i>	piedmont joint-grass	Poaceae	AL FL	UR	295
<i>Colubrina stricta</i>	comal snakewood	Rhamnaceae	TX	UR	
<i>Commelina gigas</i>	climbing dayflower	Commelinaceae	FL	UR	
<i>Condalia hookeri</i> var. <i>edwardsiana</i>	Edward's Brasil condalia	Rhamnaceae	TX	UR	
<i>Conradina brevifolia</i>	short-leaved rosemary	Lamiaceae	FL	UR	60
<i>Conradina glabra</i>	panhandle rosemary	Lamiaceae	FL	UR	233 ^a
<i>Conradina grandiflora</i>	large-flowered rosemary	Lamiaceae	FL	UR	90 ^a
<i>Conradina verticillata</i>	whorled-leaved rosemary	Lamiaceae	KY TN	UR	61 ^a
<i>Cordia bellonis</i>	showy cordia	Boraginaceae	PR	UR	
<i>Cordia rupicola</i>	cliff cordia	Boraginaceae	PR VI British VI	UR	
<i>Cordia wagnerorum</i>	Wagner's cordia	Boraginaceae	PR	UR	
<i>Coreopsis heterolepis</i>	varying tickseed	Asteraceae	AR	None(3B)	
<i>Coreopsis intermedia</i>	golden-wave tickseed	Asteraceae	LA TX	SR-E (3C)	163
<i>Coreopsis latifolia</i>	broad-leaved tickseed	Asteraceae	GA NC SC	UR	210
<i>Coreopsis pulchra</i>	beautiful tickseed	Asteraceae	AL	UR	282
<i>Coreopsis tripteris</i> var. <i>subrhomboides</i>		Asteraceae	TX	None(3B)	

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<i>Cornutia obovata</i>	montane cornutia	Verbenaceae	PR	UR	
<i>Coryphantha dasyacantha</i> var. <i>varicolor</i>	varied-colored long-stemmed corycactus	Cactaceae	TX	UR	
<i>Coryphantha duncanii</i>	Duncan's corycactus	Cactaceae	NM TX	UR	
<i>Coryphantha hesteri</i>	Hester's corycactus	Cactaceae	TX	UR	
<i>Coryphantha minima</i>	minute corycactus	Cactaceae	TX	E	
<i>Coryphantha ramillosa</i>	Big Bend corycactus	Cactaceae	TX Mexico (Coahuila)	T	
<i>Coryphantha scheeri</i> var. <i>uncinata</i>	Scheer's hooked spined corycactus	Cactaceae	TX	UR	
<i>Coryphantha sneedii</i> var. <i>sneedii</i>	Sneed's Franklin Mtn. corycactus	Cactaceae	NM TX	E	
<i>Coryphantha strobiliformis</i> var. <i>durispina</i>	Hard-spined incense	Cactaceae	TX Mexico	UR	
<i>Coryphantha sulcata</i> var. <i>nickelsiae</i>	Nickelson's grooved corycactus	Cactaceae	TX Mexico	UR	
<i>Coursetia axillaris</i>	Texas baby-bonnets	Fabaceae	TX Mexico	UR	
<i>Crataegus berberifolia</i>	barberry-leaved hawthorn	Rosaceae	TX	UR	
<i>Crataegus harbisonii</i>	Harbison hawthorn	Rosaceae	AL GA TN	UR	
<i>Crataegus stenosepala</i>	narrow-sepaled hawthorn	Rosaceae	TX	None (3B)	
<i>Crataegus sutherlandensis</i>	Sutherland's hawthorn	Rosaceae	TX	None (3B)	
<i>Crataegus warneri</i>	Warner's hawthorn	Rosaceae	TX	UR	
<i>Crescentia portoricensis</i>	Puerto Rican calabash	Bignoniaceae	PR	UR	
<i>Croomia pauciflora</i>	few-flowered croomia	Stemonaceae	AL FL GA	UR	152

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
<i>Croton alabamensis</i>	Alabama croton	Euphorbiaceae	AL TN	UR	53
<i>Croton elliotii</i>	Elliott's croton	Euphorbiaceae	AL FL GA	UR	172
<i>Croton glandulosus</i> var. <i>simpsonii</i>	Simpson's glandular croton	Euphorbiaceae	FL	SR-E(3B)	
<i>Croton impressus</i>	Puerto Rico croton	Euphorbiaceae	PR Hispaniola	UR	
<i>Croton nummulariifolius</i>	money cotton	Euphorbiaceae	PR Cuba Hispaniola	UR	
<i>Cryptantha crassipes</i>	Terlingua Creek cat's-eye	Boraginaceae	TX	UR	
<i>Ctenium floridanum</i>	Florida orange-grass	Poaceae	FL GA	SR-T(3C)	240
<i>Cucurbita okeechobeensis</i>	Okeechobee gourd	Cucurbitaceae	FL	UR	
<i>Cucurbita texana</i>	Texas gourd	Cucurbitaceae	TX	SR-T(3C)	
<i>Cuphea aspera</i>	tropical waxweed	Lythraceae	FL	UR	143
<i>Cuscuta attenuata</i>	slender dodder	Cuscutaceae	OK	UR	
<i>Cuscuta harperi</i>	Harper's dodder	Cuscutaceae	AL GA	UR	272
<i>Cymophyllus fraseri</i>	Fraser's sedge	Cyperaceae	KY NC PA SC TN VA WV	SR-T(3C)	27
<i>Cynanchum monense</i>	Mona Island shallow-wort	Asclepiadaceae	PR	UR	
<i>Cyperus granitophilus</i>	granite-loving flatsedge	Cyperaceae	AL GA NC SC VA	SR-T(3C)	273
<i>Cyperus onerosus</i>	burdensome flatsedge	Cyperaceae	TX	UR	
<i>Cypripedium candidum</i>	small white lady-slipper	Orchidaceae	IA IL IN KY MI MN MO ND NE NJ NY OH PA SD WI	SR-T (3C)	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
<i>Dalea bartonii</i>	Barton's dalea	Fabaceae	TX	UR	
<i>Dalea foliosa</i>	leafy prairie-clover	Fabaceae	AL IL TN	UR	35
<i>Dalea gattingeri</i>	Gattinger's prairie-clover	Fabaceae	AL GA TN	SR-T(3C)	280
<i>Dalea reverchonii</i>	Comanche-peak prairie - clover	Fabaceae	TX	UR	
<i>Dalea sabinalis</i>	Sabinal prairie-clover	Fabaceae	TX	UR	
<i>Daphnopsis hellerana</i>	Heller's false daphne	Thymelaeaceae	PR	UR	
<i>Deeringothamnus pulchellus</i>	slimpetal pawpaw	Annonaceae	FL	UR	109
<i>Deeringothamnus rugelii</i>	Rugel's pawpaw	Annonaceae	FL	UR	110
<i>Delphinium alabamicum</i>	Alabama larkspur	Ranunculaceae	AL	UR	245
<i>Delphinium newtonianum</i>	Newton's larkspur	Ranunculaceae	AR	UR	246
<i>Delphinium treleasei</i>	Trelease's larkspur	Ranunculaceae	AR MO	UR	
<i>Dendropemon sintenisii</i>	Sintenis' mistletoe	Loranthaceae	PR	UR	
<i>Dentaria incisa</i>		Brassicaceae	TN	SR-E(3B)	
<i>Desmodium lindheimeri</i>	Lindheimer's tick-treefoil	Fabaceae	TX Mexico	UR	
<i>Dicerandra cornutisima</i>		Lamiaceae	FL	UR	
<i>Dicerandra frutescens</i>	shrubby dicerandra	Lamiaceae	FL	UR	62
<i>Dicerandra immaculata</i>	spotless-petaled dicerandra	Lamiaceae	FL	UR	63 ^a
<i>Dicerandra odoratissima</i>	rose dicerandra	Lamiaceae	FL GA SC	SR-T (3C)	91
<i>Dicliptera krugii</i>	Krug's dicliptera	Acanthaceae	PR	SR-E(3B)	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
Digitaria floridana	longleaf crabgrass	Poaceae	FL	UR	
Digitaria gracillima	longleaf crabgrass	Poaceae	FL	UR	
Digitaria pauciflora	few-flowered crabgrass	Poaceae	FL	UR	
Dionaea muscipula	common venus' flytrap	Droseraceae	NC SC	UR	127
Dodecatheon frenchii	French's shooting-star	Primulaceae	AR IL IN KY OH MO	SR-T(3C)	
Draba aprica	open-ground whitlow-grass	Brassicaceae	AR GA MO OK SC	UR	166 ^a
Dyschoriste crenulata	wavy-leaved dyschoriste	Acanthaceae	TX Mexico	SR-T(3C)	
Dyssodia tephroleuca	ashy dogweed	Asteraceae	TX	UR	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
Echinacea laevigata	smooth purple coneflower	Asteraceae	AL GA MD NC SC VA	UR	118
Echinaceae tennesseensis	Tennessee purple cone-flower	Asteraceae	TN	E	119 ^a
Echinocereus blankii var. angusticeps	yellow alicocha hedgehog-cactus	Cactaceae	TX	UR	
Echinocereus chloranthus var. neocapillus	Texas hedgehog-cactus	Cactaceae	TX	UR	
Echinocereus lloydii	Lloyd's hedgehog-cactus	Cactaceae	TX	UR	
Echinocereus reichenbachii var. albertii	Reichenbach's purple-spined hedgehog-cactus	Cactaceae	TX	E	
Echinocereus reichenbachii var. chisoensis	Reichenbach's chisos mountains hedgehog-cactus	Cactaceae	TX Mexico	UR	
Echinocereus reichenbachii var. fitchii	Reichenbach's brownish-spined hedgehog-cactus	Cactaceae	TX	UR	
Echinocereus russanthus	rusty hedgehog-cactus	Cactaceae	TX	UR	
Echinocereus viridiflorus var. correllii	Correll's green-flowered hedgehog-cactus	Cactaceae	TX	UR	
Echinocereus viridiflorus var. davisii	Davis' green-flowered hedgehog-cactus	Cactaceae	TX	E	
Eleocharis austrotexana	southern Texas spike-rush	Cyperaceae	TX	UR	
Eleocharis cylindrica	cylinder spike-rush	Cyperaceae	TX Mexico	UR	
Elliottia racemosa	common southern plume	Ericaceae	GA SC	UR	29 ^a
Elodea linearis	Nashville waterweed	Hydrocharitaceae	TN	UR	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number†</u>
<i>Elymus svensonii</i>	Svenson's wild-rye	Poaceae	TN	UR	294
<i>Elytraria carolinensis angustifolia</i>	narrow-leaved Carolina scalysem	Acanthaceae	FL	UR	
<i>Elytraria carolinensis carolinensis</i>	Carolina scalysem	Acanthaceae	FL GA SC	SR-T(3C)	
<i>Encyclia boothiana erythronioides</i>	Booth's dogtooth orchid	Orchidaceae	FL Bahamas, Belize, Cuba, Jamaica, Mexico, Hispaniola, South America	UR	
<i>Encyclia krugii</i>	Krug's orchid	Orchidaceae	PR	SR-E(3C)	
<i>Encyclia sintenisii</i>	Sintenis' orchid	Orchidaceae	PR Cuba, Jamaica, Hispaniola	UR	
<i>Epidendrum lacerum</i>	torn orchid	Orchidaceae	PR Cuba	UR	
<i>Epidendrum kranzlinii</i>	Kranzlin's orchid	Orchidaceae	PR	None(3C)	
<i>Epithelantha bokei</i>	Boke's button-cactus	Cactaceae	TX Mexico	UR	
<i>Eragrostis tracyi</i>	Sanibel love-grass	Poaceae	FL	UR	
<i>Erigeron bigelovii</i>	Bigelow's fleabane	Asteraceae	TX Mexico	UR	
<i>Erigeron mimegletes</i>		Asteraceae	TX	UR	
<i>Eriocaulon kornickianum</i>	small-headed pipewort	Eriocaulaceae	AR GA OK TX	UR	31
<i>Eriochloa michauxii simpsonii</i>	Simpson's cup-grass	Poaceae	FL	UR	
<i>Eriogonum allenii</i>	Allen's wild-buckwheat	Polygonaceae	VA WV	None (3C)	
<i>Eriogonum correllii</i>	Correll's wild-buckwheat	Polygonaceae	TX	SR-T (3C)	
<i>Eriogonum floridanum</i>	Scrub wild-buckwheat	Polygonaceae	FL	UR	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number</u>
<i>Eriogonum longifolium harperi</i>	Harper's long-leaved wild-buckwheat	Polygonaceae	AL TN	UR	187
<i>Eriogonum nealleyi</i>	Irion county wild-buckwheat	Polygonaceae	TX	UR	
<i>Ericogonum suffruticosum</i>	bushy wild-buckwheat	Polygonaceae	TX	UR	
<i>Erithalis revoluta</i>	Puerto Rico erithalis	Rubiaceae	PR	UR	
<i>Erygium cunefolium</i>	wedge-leaved button-snake roots	Apiaceae	FL	UR	111
<i>Eugenia haematocarpa</i>	red-pistilled eugenia	Myrtaceae	PR	UR	
<i>Eugenia margarettae</i>	Margaret's eugenia	Myrtaceae	PR	UR	
<i>Eugenia underwoodii</i>	Underwood's eugenia	Myrtaceae	PR	UR	
<i>Eulophia ecristata</i>	false coco	Orchidaceae	FL LA MS NC SC Cuba	UR	
<i>Eupatorium borinquense</i>	Puerto Rico thoroughwort	Asteraceae	PR	UR	
<i>Eupatorium droserolepis</i>	oreganillo thoroughwort	Asteraceae	PR	UR	
<i>Eupatorium luciae-brauniae</i>	Lucy Brown's thoroughwort	Asteraceae	KY TN	UR	262
<i>Eupatorium oteroi</i>	Mona Island thoroughwort	Asteraceae	PR	UR	
<i>Eupatorium resinosum kentuckiense</i>	Kentucky resin boneset	Asteraceae	KY	SF-E(3B)	
<i>Eupatorium resinosum</i> var. <i>resinosum</i>	Common resir. boneset	Asteraceae	DE NJ NC	UR	
<i>Eupatorium saltuense</i>	Pasture thoroughwort	Asteraceae	NC VA	None(3B)	263
<i>Euphorbia austrina</i>	pineland spurge	Euphorbiaceae	FL	UR	
<i>Euphorbia cummulicola</i>	sand-dune spurge	Euphorbiaceae	FL	UR	
<i>Euphorbia deltoidea</i> ssp. <i>deltoidea</i>	wild thyme spurge	Euphorbiaceae	FL	UR	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
<i>Euphorbia deltoidea</i> ssp. <i>seryphyllum</i>	wild thyme spurge	Euphorbiaceae	FL	UR	
<i>Euphorbia discoidalis</i>	Appalachicola spurge	Euphorbiaceae	FL	UR	228
<i>Euphorbia exserta</i>	exserted-fruited spurge	Euphorbiaceae	FL	UR	278
<i>Euphorbia fendleri</i> var. <i>triligulata</i>	Fendler's suffrutescent spurge	Euphorbiaceae	TX	UR	
<i>Euphorbia garberi</i>	Garber's spurge	Euphorbiaceae	FL	UR	
<i>Euphorbia golondrina</i>	boquillas spurge	Euphorbiaceae	TX	UR	
<i>Euphorbia innocua</i>	velvet spurge	Euphorbiaceae	TX	None (3C)	
<i>Euphorbia jejuna</i>	drawf spruge	Euphorbiaceae	TX	UR	
<i>Euphorbia perennans</i>	perennial spurge	Euphorbiaceae	TX	UR	
<i>Euphorbia porterana</i> var. <i>keyensis</i>	Porter's hairy podded spurge	Euphorbiaceae	FL	UR	
<i>Euphorbia porterana</i> var. <i>porterana</i>	Porter's broad-leaved spurge	Euphorbiaceae	FL	UR	
<i>Euphorbia porterana</i> var. <i>scoparia</i>	Porter's broom spurge	Euphorbiaceae	FL	UR	
<i>Euphorbia purpurea</i>	Wolf's milk spurge	Euphorbiaceae	DE MD NJ NC PA VA WV	UR	
<i>Euphorbia roemerana</i>	roemer spurge	Euphorbiaceae	TX	UR	
<i>Euphorbia strictior</i>	panhandle spurge	Euphorbiaceae	NM TX	UR	
<i>Euphorbia telephoides</i>	telephus spurge	Euphorbiaceae	FL	UR	32
<i>Eurytaenia hinckleyi</i>	Hinckley's spread-wing	Apiaceae	TX	UR	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
<i>Festuca ligulata</i>	Guadalupe fescue	Poaceae	TX	UR	
<i>Fimbristylis perpusilla</i>	Vahl's fimbry	Cyperaceae	GA SC	UR	28
<i>Forestiera segregata</i> pinetorum	pinewood privet	Oleaceae	FL	UR	
<i>Fothergilla gardenii</i>	dwarf witch-alder	Hamamelidaceae	AL FL GA MS NC SC	SR-T(3C)	81
<i>Frankenia johnstonii</i>	Johnston's frankenia	Frankeniaceae	TX	UR	
<i>Franklinia alatamaha</i>	Georgia franklin-tree	Theaceae	GA	UR	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
<i>Galactia eggersii</i>	Egger's milkpea	Fabaceae	VI British VI	UR	
<i>Galactia pinetorum</i>	Small's milkpea	Fabaceae	FL	UR	
<i>Galium correllii</i>	cliff bedstraw	Rubiaceae	TX	UR	
<i>Gaura demareei</i>	Demaree's gaura	Onagraceae	AR	UR	
<i>Genistidium dumosum</i>	Johnston bruch-pea	Fabaceae	TX Mexico	UR	
<i>Gentiana austromontana</i>	Southern mountain gentian	Gentianaceae	NC TN VA WV	None (3B)	
<i>Gentiana autumnalis</i>	pine barren gentian	Gentianaceae	DE NJ NC SC VA	UR	
<i>Gentiana deloachii</i>	DeLoach's gentian	Gentianaceae	GA	None(3B)	
<i>Gentiana pennelliana</i>	wiregrass gentian	Gentianaceae	FL	UR	59 ^a
<i>Geocarpon minimum</i>	little geocarpon	Caryophyllaceae	AR MO	UR	270
<i>Gesneria pauciflora</i>	few-flowered gesneria	Gesneriaceae	PR	UR	
<i>Geum geniculatum</i>	bent avens	Rosaceae	NC TN	UR	248
<i>Geum radiatum</i>	spreading avens	Rosaceae	NC TN	UR	193
<i>Gloeocantharellus purpurascens</i>	Indian Creek mushroom	Gomphaceae	NC	UR	
<i>Glyceria nubigena</i>	Smoky Mountain manna-grass	Poaceae	NC TN	UR	185
<i>Goetzea elegans</i>	beauty goetzea	Solanaceae	PR	UR	^b 317
<i>Gonocalyx concolor</i>		Ericaceae	PR	UR	
<i>Graffenrieda ottoschulzii</i>	Petites Graines Camasey	Melastomataceae	PR Dominican Republic, Haiti	UR	
<i>Grammitis nimbata</i>	frivolous grammitis	Polypodiaceae	NC Cuba, Jamaica	UR	
<i>Grindelia oolepis</i>	plains gum-weed	Asteraceae	TX	SR-E(3C)	
<i>Gymnocyon floridanus</i>	Florida beardgrass	Poaceae	FL	UR	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number†</u>
<i>Harpercallis flava</i>	Yellow-petaled Harper's beauty	Liliaceae	FL	E	134 ^a
<i>Hartwrightia floridana</i>	Florida hartwrightia	Asteraceae	FL GA	UR	68
<i>Hechtia texensis</i>	Texas false-agave	Bromeliaceae	TX	SR-E (3B)	
<i>Hedeoma apiculatum</i>	McKittrick pennyroyal	Lamiaceae	NM TX	PT	
<i>Hedeoma graveolens</i>	mock pennyroyal	Lamiaceae	FL	UR	64
<i>Hedeoma molle</i>		Lamiaceae	TX	None(3C)	
<i>Hedeoma pilosum</i>	old blue pennyroyal	Lamiaceae	TX	UR	
<i>Hedyotis nigricans pulvinata</i>	mat-forming narrow-leaved bluet	Rubiaceae	FL	UR	195
<i>Hedyotis purpurea montana</i>	mountain purple bluet	Rubiaceae	NC	UR	303
<i>Heimia longipes</i>	stalk-flower heimia	Lythraceae	TX	UR	
<i>Helianthus carnosus</i>	lake-side sunflower	Asteraceae	FL	UR	120
<i>Helianthus debilis vestitus</i>	hairy cucumber-leaf sunflower	Asteraceae	FL	UR	211
<i>Helianthus eggertii</i>	Eggert's sunflower	Asteraceae	AL KY TN	UR	69
<i>Helianthus glaucophyllus</i>	white leaved sunflower	Asteraceae	NC TN	UR	264
<i>Helianthus ludens</i>	field goldeneye	Asteraceae	TX	UR	
<i>Helianthus paradoxus</i>	puzzle sunflower	Asteraceae	TX	UR	
<i>Helianthus praecox ssp. hirtus</i>	hairy Texas sunflower	Asteraceae	TX	UR	
<i>Helianthus schweinitzii</i>	Schweinitz's sunflower	Asteraceae	NC SC	UR	212

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number†</u>
<i>Helianthus smithii</i>	Smith's sunflower	Asteraceae	AL GA	UR	164
<i>Heliotropium guanicense</i>	tropical-island turnsole	Boraginaceae	PR	UR	
<i>Heliotropium polyphyllum</i> var. <i>horizontale</i>	prostrate many-leaved turnsole	Boraginaceae	FL	UR	
<i>Helonias bullata</i>	swamp-pink	Liliaceae	DE GA MD NC NJ NY PA SC VA	UR	
<i>Heterotheca flexuosa</i>	bent golden-aster	Asteraceae	FL	UR	70 ^a
<i>Heterotheca ruthii</i>	Ruth's telegraph plant	Asteraceae	TN	UR	165 ^a
<i>Heuchera americana</i> var. <i>hispidula</i>	rough American alumroot	Saxifragaceae	VA WV	SR-T(3C)	
<i>Heuchera arkansana</i>	Arkansas alumroot	Saxifragaceae	AR	UR	251
<i>Hexalectris grandiflora</i>	Greenman's coral-root	Orchidaceae	TX Mexico	UR	
<i>Hexalectris nitida</i>	Glass Mountain coral-root	Orchidaceae	TX	UR	
<i>Hexalectris revoluta</i>	Chios coral-root	Orchidaceae	TX Mexico	UR	
<i>Hexastylis contracta</i>	southern heartleaf	Aristolochiaceae	NC TN	UR	259
<i>Hexastylis lewisii</i>	Lewis's heartleaf	Aristolochiaceae	NC VA	UR	260
<i>Hexastylis naniflora</i>	dwarf-flowered heartleaf	Aristolochiaceae	NC SC VA	UR	159 ^a
<i>Hexastylis speciosa</i>	Harper's heartleaf	Aristolochiaceae	AL	UR	116
<i>Hibiscus dasycalyx</i>	Neches river rose-mallow	Malvaceae	TX	UR	
<i>Hoffmannseggia tenella</i>	slender rush-pea	Fabaceae	TX	UR	
<i>Hudsonia montana</i>	golden mountain heather	Cistaceae	NC	T	167 ^a

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number†</u>
<i>Hydrastis canadensis</i>	common golden seal	Ranunculaceae	AL AR CT DE GA IL IN KY MD MI MN MO MS NC NE NY OH PA TN VA VT WV WI Canada	SR-T(3C)	
<i>Hymenocallis coronaria</i>	stream-bank spiderlily	Liliaceae	AL GA SC	UR	135
<i>Hymenocallis latifolia</i>	broad-leaved spiderlily	Liliaceae	FL Cuba Hispan- iola Caymen Islands Jamaica Bahamas	SR-T(3C)	
<i>Hymenophyllum tunbridgense</i>	Turnbridge fern	Hymenophyllaceae	SC Europe	UR	173
<i>Hymenoxys texana</i>	Texas bitterweed	Asteraceae	TX	UR	
<i>Hymenoxys turneri</i>		Asteraceae	TX	None(3C)	
<i>Hypericum cumulicola</i>	highlands scrub St. John's wort	Hypericaceae	FL	UR	83
<i>Hypericum edsonianum</i>	Edison's St. John's-wort	Hypericaceae	FL	UR	84
<i>Hypericum lissophloeus</i>	smooth-barked St. John's- wort	Hypericaceae	FL	UR	284
<i>Hypericum sphaerocarpum</i> var. <i>turgidum</i>	turgid round-fruited St. John's- wort	Hypericaceae	AL KY TN	SR-T(3C)	
<i>Hypoxis longii</i>	Long's star-grass	Amaryllidaceae	AR LA OK TX VA	SR-E(3C)	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
<i>Ilex amelanchier</i>	serviceberry holly	Aquifoliaceae	AL FL GA LA MS NC SC	UR	114
<i>Ilex cookii</i>	te holly	Aquifoliaceae	PR	UR	
<i>Ilex opaca arenicola</i>	sand-loving American holly	Aquifoliaceae	FL	UR	115
<i>Iliamna corei</i>	Core's globe-mallow	Malvaceae	VA	UR	
<i>Iliamna remota</i>	Kankakee globe-mallow	Malvaceae	IL IN VA	UR	
<i>Illicium parviflorum</i>	yellow anisetree	Magnoliaceae	FL	UR	144
<i>Ipomoea cardiophylla</i>	Trans-Pecos Mtn. morning glory	Convolvulaceae	TX	UR	
<i>Ipomoea krugii</i>	white morning glory	Convolvulaceae	PR	UR	
<i>Isoetes flaccida</i>	Florida quillwort	Isoetaceae	FL GA	None(3C)	
<i>Isoetes lithophylla</i>	rock quillwort	Isoetaceae	TX	UR	
<i>Isoetes louisianensis</i>	Louisiana quillwort	Isoetaceae	GA LA	UR	174
<i>Isoetes melanospora</i>	black-spored quillwort	Isoetaceae	GA SC	UR	
<i>Isoetes tegetiformans</i>		Isoetaceae	GA NC	UR	
<i>Isoetes virginica</i>	Virginia quillwort	Isoetaceae	VA GA	UR	
<i>Isotria medeoloides</i>	small-whorled pogonia	Orchidaceae	CT GA IL MA MD ME MI MO NH NC NJ NY PA RI SC VA VT Canada	PE	315 ^b

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number</u>
Jacquemontia curtissii	Curtiss' clustervine	Convolvulaceae	FL	UR	
Jacquemontia reclinata	reclined clustervine	Convolvulaceae	FL	UR	
Jamesianthus alabamensis	Alabama jamesianthus	Asteraceae	AL	UR	121
Jaquinia umbellata	Puerto Rico jacquinia	Theophrastaceae	PR Hispaniola	UR	
Juncus caesariensis	New Jersey rush	Juncaceae	MD NJ VA	UR	231
Juncus georgianus	Georgia rush	Juncaceae	AL GA NC SC	None	232
Juncus gymnocarpus	Coville's rush	Juncaceae	AL FL MS NC PA SC TN	SR-T (3C)	87
Juncus trifidus carolinianus	one-flowered rush	Juncaceae	NC	UR	
Justicia borinquensis	Puerto Rico water-willow	Acanthaceae	PR	UR	
Justicia cooleyi	Cooley's water-willow	Acanthaceae	FL	UR	106
Justicia crassifolia	thick-leaved water-willow	Acanthaceae	FL	UR	107
Justicia culebritae	Culebra Island water-willow	Acanthaceae	PR, British VI	UR	
Justicia mortuifluminis		Acanthaceae	VA	SR-T (3B)	256
Justicia runyonii	Runyon's water-willow	Acanthaceae	TX Mexico	UR	
Justicia warnockii	Warnock's water-willow	Acanthaceae	TX	UR	
Justicia wrightii	Wright's water-willow	Acanthaceae	TX	UR	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number</u>
Kalmia cuneata	white-wicky laurel	Ericaceae	NC SC	UR	171
Kosteletzkya smilacifolia	southern sea-shore mallow	Malvaceae	AL FL	UR	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
<i>Lachnocaulon beyrichianum</i>	southern bog buttons	Eriocaulaceae	FL GA NC SC	SR-T (3C)	30
<i>Laplacea portoricensis</i>	Puerto Rico laplacea	Theaceae	PR Hispaniola	UR	
<i>Leavenworthia alabamica</i> var. <i>alabamica</i>	Alabama glade-cress	Brassicaceae	AL	UR	10 ^a
<i>Leavenworthia alabamica</i> var. <i>brachystyla</i>	short-styled glade-cress	Brassicaceae	AL	UR	11 ^a
<i>Leavenworthia aurea</i>	golden glade-cress	Brassicaceae	OK TX	SR-E (3C)	219
<i>Leavenworthia crassa</i> var. <i>crassa</i>	fleshy-fruited glade-cress	Brassicaceae	AL	UR	12 ^a
<i>Leavenworthia crassa</i> var. <i>elongata</i>	Falkville glade-cress	Brassicaceae	AL	UR	13 ^a
<i>Leavenworthia exigua</i> var. <i>exigua</i>	Tennessee glade-cress	Brassicaceae	AL GA TN	UR	14
<i>Leavenworthia exigua</i> var. <i>laciniata</i>	Sheperdsville glade-cress	Brassicaceae	KY	UR	15
<i>Leavenworthia exigua</i> var. <i>lutea</i>	pasture glade-cress	Brassicaceae	AL TN	UR	16 ^a
<i>Leavenworthia stylosa</i>	limestone glade-cress	Brassicaceae	AL TN	UR	17
<i>Leavenworthia torulosa</i>	string-of-beads glade-cress	Brassicaceae	AL KY TN	UR	18
<i>Lechea cernua</i>	nodding pinweed	Cistaceae	FL	UR	20
<i>Lechea divaricata</i>	pine pinweed	Cistaceae	FL	UR	21
<i>Lechea lakelae</i>	Lakela's pinweed	Cistaceae	FL	UR	
<i>Lechea maritima</i> var. <i>virginica</i>	Virginian pinweed	Cistaceae	MD VA	SR-E (3C)	168
<i>Lechea mensalis</i>	Chisos Mountain pinweed	Cistaceae	TX	UR	
<i>Leitneria floridana</i>	Florida corkwood	Leitneriaceae	AR FL GA MO TX	SR-T (3C)	287
<i>Lenophyllum texanum</i>		Crassulaceae	TX	UR	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
<i>Lepanthes dodiana</i>	Montane lepanthes	Orchidaceae	PR	SR-E (3C)	
<i>Lepanthes eltoroensis</i>	Lequillo Mountain lepanthes	Orchidaceae	PR	UR	
<i>Lepanthopsis melanatha</i>	Harris' lepanthes orchid	Orchidaceae	FL Cuba, Dom. Rep., Haiti, Jamaica	UR	
<i>Lepidospartum burgessii</i>		Asteraceae	TX	UR	
<i>Lesquerella angustifolia</i>	thread-leaved bladderpod	Brassicaceae	OK TX	SR-T (3C)	
<i>Lesquerella densipila</i>	Duck river bladderpod	Brassicaceae	AL TN	SR-E (3C)	1
<i>Lesquerella globosa</i>	globose bladderpod	Brassicaceae	IN KY TN	UR	42
<i>Lesquerella lescurei</i>	Nashville bladderpod	Brassicaceae	AL TN	SR-T(3C)	43
<i>Lesquerella lyrata</i>	Lyrate bladderpod	Brassicaceae	AL	UR	44
<i>Lesquerella mcvaughiana</i>	McVaugh's bladderpod	Brassicaceae	TX	UR	
<i>Lesquerella perforata</i>	Spring Creek bladderpod	Brassicaceae	TN	UR	45
<i>Lesquerella stonensis</i>	Stone's river bladderpod	Brassicaceae	TN	UR	46
<i>Lesquerella thamnophila</i>	Zapata county bladderpod	Brassicaceae	TX	UR	
<i>Lesquerella valida</i>	strong bladderpod	Brassicaceae	NM TX	SR-E (3C)	
<i>Liatrix cymosa</i>	branched gay-feather	Asteraceae	TX	SR-T (3C)	
<i>Liatrix helleri</i>	Heller's gay-feather	Asteraceae	NC	UR	213 ^a
<i>Liatrix ohlingerae</i>	Florida gay-feather	Asteraceae	FL	UR	122
<i>Liatrix provincialis</i>	Godfrey's gay-feather	Asteraceae	FL	UR	123 ^a
<i>Liatrix tenuis</i>	slender gay-feather	Asteraceae	TX	SR-T (3C)	
<i>Lilaeopsis carolinensis</i>	Carolina lilaeopsis	Apiaceae	AL FL GA LA MS NC SC VA	UR	
<i>Lilium grayii</i>	Gray's lily	Liliaceae	NC TN VA	UR	136

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number†</u>
<i>Lilium iridollae</i>	panhandle lily	Liliaceae	AL FL	UR	137
<i>Limonium carolinianum</i> var. <i>angustatum</i>		Plumbaginaceae	FL	SR-E (3B)	
<i>Limonium limbatum</i>	alkaline-flat sea-lavender	Plumbaginaceae	AL NM TX	None (3C)	
<i>Lindera melissaefolium</i>	swamp spicebush	Lauraceae	AL AR FL GA LA MO MS NC SC	UR	99
<i>Lindernia saxicola</i>	Carolina pimpernel	Scrophulariaceae	GA NC	UR	
<i>Linum arenicola</i>	sand flax	Linaceae	FL	UR	
<i>Linum carteri</i> var. <i>carteri</i>	Carter's small-flowered flax	Linaceae	FL	UR	
<i>Linum carteri</i> var. <i>smalli</i>	Carter's large-flowered flax	Linaceae	FL	UR	179
<i>Linum macrocarpum</i>	Mobile flax	Linaceae	AL	UR	
<i>Linum sulcatum</i> var. <i>harper</i>	Harper's grooved-yellow flax	Linaceae	AL FL GA	UR	
<i>Linum westii</i>	West's flax	Linaceae	FL GA	UR	66
<i>Litsea aestivalis</i>	pond-spice	Lauraceae	FL GA NC SC TN VA	SR-T (3C)	101
<i>Lobelia appendiculata</i> var. <i>gattingeri</i>	Gattinger's lobelia	Campanulaceae	TN	UR	268
<i>Lupinus aridorum</i>		Fabaceae	FL	UR	
<i>Lupinus westianus</i>	panhandle lupine	Fabaceae	FL	UR	131
<i>Lycium berberioides</i>	silvery wolf-berry	Solanaceae	TX	UR	
<i>Lycium texanum</i>	Texas wolf-berry	Solanaceae	TX	UR	
<i>Lycopodium portoricensis</i>		Lycopodiaceae	PR	SR-E (3B)	
<i>Lysimachia asperulaefolia</i>	Carolina loosestrife	Primulaceae	NC SC	UR	301

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
Lythrum curtissii	Curtiss' lythrum	Lythraceae	FL GA	UR	234
Lythrum flagellare	lowland lythrum	Lythraceae	FL	UR	235
Lythrum ovalifolium	oval-leaved lythrum	Lythraceae	TX	UR	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
Macbridea alba	white birds-in-a-nest	Lamiaceae	FL	UR	65
Machaeranthera aurea	Houston aster	Asteraceae	TX	SR-E (3B)	
Magnolia ashei	Ashe magnolia	Magnoliaceae	FL	UR	236
Malpighia infestissima		Malpighiaceae	VI	UR	
Manihot walkerae	Walker's manihot	Euphorbiaceae	TX Mexico	UR	
Mariscus urbanii		Cyperaceae	PR	UR	
Marlierea sintenisii	Sintenis' marlierea	Myrtaceae	PR	UR	
Marsdenia elliptica	elliptic leaved condorvine	Asclepiadaceae	PR	UR	
Marshallia mohrii	Mohr's barbar's- buttons	Asteraceae	AL FL GA	UR	124
Marshallia ramosa	southern barbar's- buttons	Asteraceae	FL GA	SR-T (3C)	38
Matelea alabamensis	Alabama milkvine	Asclepiadaceae	AL FL GA	UR	160
Matelea brevicoronata	short-corona milkvine	Asclepiadaceae	TX	UR	
Matelea edwardsensis	plateau milkvine	Asclepiadaceae	TX	SR-E (3C)	
Matelea floridana	Florida milkvine	Asclepiadaceae	FL	UR	208
Matelea parviflora		Asclepiadaceae	TX	SR-T (3C)	
Matelea radiata	falfurrias milkvine	Asclepiadaceae	TX	UR	
Matelea texensis	Trans-Pecos milkvine	Asclepiadaceae	TX	UR	
Maytenus cymosa	Caribbean mayten	Celastraceae	PR VI, British VI	UR	
Maytenus elongata	Puerto rico mayten	Celastraceae	PR	UR	

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Maytenus ponceana	Ponce mayten	Celastraceae	PR	UR	
Melanthera parviflora	small-leaved melanthera	Asteraceae	FL	UR	
Mesadenus portoricensis	Puerto Rico ladies' tresses	Orchidaceae	PR	UR	
Micranthemum micranthemoides	Nuttall's mud-flower	Scrophulariaceae	DE DC MD NJ NY PA VA	UR	
Mikania stevensiana	Steven's hempweed	Asteraceae	PR	UR	
Minuarita godfreyi		Caryophyllaceae	AL FL NC SC	UR	318
Minuarita uniflora	one-flowered sandwort	Caryophyllaceae	AL GA NC SC	SR-T (3C)	
Mitracarpus maxwelliae	Maxwell's mitracarpus	Rubiaceae	PR	UR	
Mitracarpus polycladus	Guanica mitracarpus	Rubiaceae	PR	UR	
Monarda stipitatoglandulosa	stripped gland bee-balm	Lamiaceae	AR OK	None (3C)	285
Monotropa brittonii	Britton's pinesap	Ericaceae	FL	UR	
Montropsis reynoldsiae		Ericaceae	FL	UR	
Muhlenbergia torreyana	Torrey's muhly	Poaceae	DE GA KY NJ NY TN	UR	
Muhlenbergia villosa	hairy muhly	Poaceae	NM TX	UR	
Myrcia paganii		Myrtaceae	PR	UR	
Myrcianthes fragrans simpsonii	Simpson's stooper	Myrtaceae	FL	UR	
Myriophyllum laxum	piedmont water-milfoil	Haloragaceae	AL FL GA NC SC	UR	80

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
<i>Nama xylopodum</i>	yellowseed fiddleleaf	Hydrophyllaceae	NM TX	SR-T (3C)	
<i>Nartheceum americanum</i>		Liliaceae	DE NK NY NC SC	UR	
<i>Nemastylis floridana</i>	fall-flowered pleatleaf	Iridaceae	FL	UR	85
<i>Nemopanthus collins</i>		Aquifoliaceae	NC VA WV	UR	
<i>Neolloydia gautii</i>	Gaut's butterfly	Cactaceae	TX	UR	
<i>Neolloydia mariposensis</i>	terlingua butterfly	Cactaceae	TX Mexico, (Coahuila)	T	
<i>Neolloydia warnockii</i>	Warnock's butterfly	Cactaceae	TX	UR	
<i>Nephropetalum pringlei</i>	Pringle's kidneypetal	Sterculiaceae	TX Mexico	UR	
<i>Nestronia umbellula</i>	common nestronia	Santalaceae	AL GA NC SC VA	UR	250
<i>Neviusia alabamensis</i>	Alabama snow-wreath	Rosaceae	AL AR MS MO NC TN	UR	
<i>Nolina arenicola</i>	sand beargrass	Liliaceae	TX	UR	
<i>Nolina atopocarpa</i>	Florida beargrass	Liliaceae	FL	UR	138
<i>Nolina brittoniana</i>	Britton's beargrass	Liliaceae	FL	UR	139
<i>Notholaena schaffneri</i> ssp. nealleyi		Polypodiaceae	TX	UR	
<i>Nuphar luteum</i> ssp. <i>ulvaceum</i>	west Florida cowlily	Nymphaeaceae	FL	UR	238

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
Oenothera pilosella ssp. sessilis	coastal evening-primrose	Onagraceae	AR LA TX	UR	288
Oncidium carthagenense	spread-eagle oncidium	Orchidaceae	FL Mexico, South America, Central America	UR	
Onosmodium helleri	Heller's false-gromwell	Boraginaceae	TX	SR-T (3C)	
Onosmodium molle ssp. molle	soft-hairy false-gromwell	Boraginaceae	AL IL KY TN	UR	218
Operculina triquetra	triangular-leaved jolap	Convolvulaceae	VI	UR	
Ophioglossum dendroneuron	Florida adder's-tongue	Ophioglossaceae	FL Mexico Cuba, Philipines, Africa, South America	None (3C)	
Ophioglossum palmatum	hand adder's-tongue fern	Ophioglossaceae	FL West Indies	SR-T (3C)	207 ^a
Opuntia arenaria	sand prickly-pear	Cactaceae	NM TX Mexico	UR	
Opuntia borinquensis		Cactaceae	PR	SR-E (3B)	
Opuntia imbricata var. argentea	silvery tree cactus	Cactaceae	TX	UR	
Opuntia spinosissima	semaphore cactus	Cactaceae	FL PR VI Jamaica, British VI	UR	
Opuntia strigil var. flexospina	flexible-spined marble-fruit prickly-pear	Cactaceae	TX	UR	
Opuntia triacantha	three-spined prickly-pear	Cactaceae	FL PR VI TX Mexico	UR	
Osmorhiza mexicana ssp. bipatriata		Apiaceae	TX Mexico	UR	
Ostrya chisosensis	Big Bend hop hornbeam	Betulaceae	TX	UR	
Ottoschulzia rhodoxylon	rosewood ottoschulzia	Icacinaeae	PR	UR	
Oxypolis canbyi	Canby's cowbane	Apiaceae	DE GA SC	UR	257
Oxypolis greenmanii	giant water cowbane	Apiaceae	FL	UR	112

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number†</u>
Panax quinquefolius	wild ginseng	Araliaceae	AL AR CT DE DC FL GA IA IL IN KY LA MA MD ME MI MN MO MS NC NE NH NJ NY OH OK PA RI SC TN VA VT WI WV Canada	SR-T (3C)	
Panicum aculeatum		Poaceae	DC MD NY VA	SR-T (3B)	
Panicum hirstii	Hirst's panic-grass	Poaceae	GA NJ	UR	241
Panicum lithophilum	Swallen's panic-grass	Poaceae	GA SC	SR-T (3B)	242
Panicum mundum		Poaceae	VA	SR-E (3B)	
Panicum nudicaule	naked-stemmed panic- grass	Poaceae	AL FL MS	UR	296
Panicum pinetorum	pineland panic-grass	Poaceae	FL	UR	
Panicum stevensianum	Steve's panic-grass	Poaceae	PR Cuba	UR	
Parnassia carolinana	Carolina grass of parnassus	Saxifragaceae	AL FL MS NC SC	UR	
Paronychia argyrocoma albimontana		Caryophyllaceae	GA MA ME NC NH TN	PE	
Paronychia chartacea	paperlike nail-wort	Caryophyllaceae	FL	UR	74
Paronychia chorizanthoides	chalk nail-wort	Caryophyllaceae	TX	UR	
Paronychia congesta	busy nail-wort	Caryophyllaceae	TX	SR-E (3C)	
Paronychia drummondii ssp. parviflora	Drummond's small- flowered nail-wort	Caryophyllaceae	TX	SR-T (3C)	
Paronychia maccartii	Laredo nail-wort	Caryophyllaceae	TX	UR	
Paronychia monticola	Livermore's nail-wort	Caryophyllaceae	TX	UR	
Paronychia nudata	naked nail-wort	Caryophyllaceae	TX	UR	

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Paronychia rugelii var. interior		Caryophyllaceae	FL GA	SR-E (3B)	
Paronychia virginica var. parksii	Park's nail-wort	Caryophyllaceae	TX	UR	
Paronychia wilkinsonii	Wilkinson's nail-wort	Caryophyllaceae	TX Mexico	UR	
Passiflora bilobata		Passifloraceae	PR Hispaniola	UR	
Passiflora murucuja		Passifloraceae	PR Hispaniola	UR	
Paxistima canbyi		Celastraceae	KY OH PA VA WV	UR	271
Penstemon baccharifolius		Scrophulariaceae	TX Mexico	None (3C)	
Penstemon cobaea var. purpureus	cobaea purple beard-tongue	Scrophulariaceae	AR MO	SR-T (3C)	
Penstemon dissectus	dissected beardtongue	Scrophulariaceae	GA	SR-T (3C)	254
Penstemon multicaulis		Scrophulariaceae	AR	None (3B)	
Peperomia floridana		Piperaceae	FL	UR	
Peperomia whelleri	Wheeler's peperomia	Piperaceae	PR	UR	
Perityle bisetosa var. bisetosa	Cox Ranch two-spiked rock-daisy	Asteraceae	TX	UR	
Perityle bisetosa var. scalaris	Stair-Step Mtn. two-spiked rock-daisy	Asteraceae	TX	UR	
Perityle cinerea	gray rock-daisy	Asteraceae	TX	SR-E (3C)	
Perityle lindheimeri var. halmifolia	Lindheimer's halimus-leaved rock-daisy	Asteraceae	TX	SR-E (3B)	
Perityle lindheimeri var. lindheimeri		Asteraceae	TX	None (3C)	
Perityle parryi		Asteraceae	TX	UR	

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Perityle vitreomontana	Glass Mountain rock-daisy	Asteraceae	TX	UR	
Perityle warnockii	river rock-daisy	Asteraceae	TX	UR	
Persea borbonia humilis	dwarf red bay perseae	Lauraceae	FL GA	SR-T (3C)	100
Persicaria paludicola		Polygonaceae	FL	SR-T (3B)	
Phacelia dubia var. georgiana	Georgia small-flowered phacelia	Hydrophyllaceae	AL GA	SR-T (3C)	82
Phacelia integrifolia var. texana	Texas gyp phacelia	Hydrophyllaceae	NM TX	None (3C)	
Phacelia pallida	pale phacelia	Hydrophyllaceae	TX	UR	
Philadelphus ernestii	canyon mock-orange	Saxifragaceae	TX	SR-T (3C)	
Philadelphus texensis var. texensis	Texas mock-orange	Saxifragaceae	TX	UR	
Phlox bifida ssp. stellaria	starwort cleft phlox	Polemoniaceae	AR IL IN KY MO TN	UR	298
Phlox buckleyi		Polemoniaceae	VA WV	None (3C)	
Phlox longipilosa	long-haired phlox	Polemoniaceae	OK	UR	
Phlox nivalis ssp. texensis	Texas trailing phlox	Polemoniaceae	TX	UR	
Phlox oklahomensis	Oklahoma phlox	Polemoniaceae	KS OK TX	SR-T (3C)	
Phlox pulchra	Wherry's phlox	Polemoniaceae	AL	UR	147
Phyllanthus ericoides	heather leaf-flower	Euphorbiaceae	TX Mexico	UR	
Phyllanthus liebmannianus platylepsis	Florida leaf-flower	Euphorbiaceae	FL	UR	54
Phyllanthus pentaphyllus floridanus	Florida five-petaled leaf flower	Euphorbiaceae	FL	UR	
Phyllitis scolopendrium americana	American hart's-tongue fern	Polypodiaceae	AL MI NY TN Canada, (British Columbia)	UR	162 ^a

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
<i>Physalis viscosa</i> var. <i>elliotii</i>	Elliot's sticky ground cherry	Solanaceae	FL	SR-T (3C)	
<i>Physostegia correllii</i>	Correll's dragon-head	Lamiaceae	FL	UR	
<i>Physostegia leptophylla</i>	slender-leaved dragon-head	Lamiaceae	FL	UR	286
<i>Physostegia micrantha</i>	Heart Creek dragon-head	Lamiaceae	OK TX	None (3B)	
<i>Physostegia veroniciformis</i>	Veronica dragon-head	Lamiaceae	FL GA	SR-T (3B)	92
<i>Pieris phillyreaefolia</i>	climbing fetter-bush	Ericaceae	AL FL GA MS SC	None (3C)	
<i>Pilea leptophylla</i>	thin-leaved clearweed	Urticaceae	PR	UR	
<i>Pilea multicaulis</i>	many-stemmed clearweed	Urticaceae	PR	UR	
<i>Pilea richardii</i>	Richard's clearweed	Urticaceae	PR	UR	
<i>Pilea yunquensis</i>	El Yungue Peak clearweed	Urticaceae	PR	UR	
<i>Pilostyles thurberi</i>	Thurber's pilostyles	Rafflesiaceae	AZ CA NV TX Mexico, (Baja California)	SR-T (3C)	
<i>Pinckneya pubens</i>	hairy fever-tree	Rubiaceae	FL GA SC	SR-T (3C)	
<i>Pinguicula ionantha</i>	violet-flowered butter-wort	Lentibulariaceae	FL	UR	132
<i>Pinguicula planifolia</i>	Chapman's butterwort	Lentibulariaceae	AL FL MS	UR	133
<i>Pisonia floridana</i>	Rock Key devil's-claws	Nyctaginaceae	FL	UR	
<i>Plantago cordata</i>	heart-leaved plantain	Plantaginaceae	AL AR FL GA KY IL IN MI MO NC NY OH VA WI Canada (Ontario)	UR	182
<i>Platanthera flava</i>	southern rein-orchid	Orchidaceae	AR DE DC FL GA IA IL IN KY LA MA ME MD MI MN MO NH NJ NY NC OH OK PA RI SC SD TN TX VT VA WV WI	SR-T (3C)	289

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
Platanthera integra	yellow fringless orchid	Orchidaceae	AL FL GA KS LA MS NC ND NJ SC SD TN TX New Brunswick, Nova Scotia, Ontario	UR	290
Platanthera integrilabia	white fringless orchid	Orchidaceae	AL KY MS NC SC TN	UR	291
Platanthera leucophaea	prairie white-fringed orchid	Orchidaceae	AR IA IL IN KS LA ME MI MN MO NE ND NY OH OK SD VA WI Canada	UR	
Platanthera peramoena	purple fringless orchid	Orchidaceae	AL AR DE IL IN KY MD MO MS NC NJ NY OH PA SC TN VA WV	SR-T (3C)	292
Pleodendron macranthum	large-flowered pleodendron	Canellaceae	PR	UR	
Poa involuta		Poaceae	TX	UR	
Polemonium pauciflorum ssp. hinckleyi		Polemoniaceae	AZ TX	UR	
Polemonium reptans villosum	softly-haired creeping polemonium	Polemoniaceae	KY OH	None (3C)	
Polianthes maculosa		Liliaceae	TX	UR	
Polianthes runyonii	Runyon's aloe	Liliaceae	TX	UR	
Poliomintha glabrescens		Lamiaceae	TX Mexico	None (3C)	
Polygala bokinii var. sparsifolia	Boykin's few-leaved milkwort	Polygalaceae	FL	UR	
Polygala cowellii	violet-tree milkwort	Polygalaceae	PR	UR	
Polygala lewtonii	Lewton's milkwort	Polygalaceae	FL	UR	186
Polygala maravillasensis		Polygalaceae	TX	SR-E (3C)	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
<i>Polygala rimulicola</i>	Steyermark's milkwort	Polygalaceae	NM TX	SR-E (3C)	
<i>Polygala smallii</i>	Small's milkwort	Polygalaceae	FL	UR	
<i>Polygonella ciliata basiramea</i>	hairy jointweed	Polygonaceae	FL	UR	148
<i>Polygonella macrophylla</i>	large-leaved jointweed	Polygonaceae	AL FL	UR	149
<i>Polygonella myriophylla</i>	Small's jointweed	Polygonaceae	FL	SR-E (3C)	150
<i>Polygonella parksii</i>	Park's jointweed	Polygonaceae	TX	SR-E (3C)	
<i>Polygonum striatulum</i>	Kleberg knotweed	Polygonaceae	TX	UR	
<i>Polygonum texense</i>	Texas knotweed	Polygonaceae	TX	SR-E (3C)	
<i>Polymnia laevigata</i>	Tennessee leaf-cup	Asteraceae	AL FL GA KY MO TN	UR	265
<i>Populus hinckleyana</i>	Goat Canyon cottonwood	Salicaceae	TX	UR	
<i>Porophyllum greggii</i>	Gregg's pore-leaf	Asteraceae	TX	UR	
<i>Portulaca caulerpoides</i>	Puerto Rico purslane	Portulacaceae	PR	UR	
<i>Portulaca smallii</i>	Small's purslane	Portulacaceae	GA NC SC VA	SR-E (3C)	243
<i>Potamogeton clystocarpus</i>	Fernald's pondweed	Potamogetonaceae	TX	UR	
<i>Potamogeton floridanus</i>	Florida pondweed	Potamogetonaceae	FL	UR	
<i>Prenanthes roanensis</i>	piedmont rattlesnake-root	Asteraceae	NC TN VA	SR-T (3C)	4
<i>Priva portoricensis</i>	Puerto Rico velvetbur	Verbenaceae	PR	UR	
<i>Proboscidea sabulosa</i>	dune unicorn-plant	Pedaliaceae	NM TX	UR	
<i>Prunus alleghaniensis</i>	Alleghany plum	Rosaceae	CT MD NJ PA TN WV	SR-T (3C)	
<i>Prunus geniculata</i>	scrub plum	Rosaceae	FL	UR	194

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number†</u>
<i>Prunus havardii</i>	Harvard plum	Rosaceae	TX	SR-T (3C)	
<i>Prunus minutiflora</i>	Texas almond	Rosaceae	TX	SR-T (3C)	
<i>Prunus murrayana</i>	Murray plum	Rosaceae	TX	UR	
<i>Prunus texana</i>	Texas peach-bush	Rosaceae	TX	SR-T (3C)	
<i>Pseudotaenidia montana</i>		Apiaceae	MD PA VA WV	None (3C)	
<i>Psidium sintenisii</i>	Sintenis' guava	Myrtaceae	PR	UR	
<i>Psoralea macrophylla</i>	Polk county scarf-pea	Fabaceae	NC	UR	
<i>Psoralea stipulata</i>	large-stipuled scarf-pea	Fabaceae	IN KY	UR	
<i>Psoralea-subacaulis</i>	southern scarf-pea	Fabaceae	AL GA TN	SR-T (3C)	281
<i>Ptilimnium fluviatile</i>	river bishop-weed	Apiaceae	AL GA MD NC WV	SR-T (3B)	113
<i>Ptilimnium nodosum</i>	piedmont bishop-weed	Apiaceae	AL GA MD NC SC WV	SR-T (3C)	258
<i>Pycnanthemum curvipes</i>	Tennessee mountain-mint	Lamiaceae	AL GA TN	UR	175
<i>Pycnanthemum floridanum</i>	Florida mountain-mint	Lamiaceae	FL	UR	93
<i>Pycnanthemum monotrichum</i>	single-haired mountain-mint	Lamiaceae	VA	None (3A)	
<i>Pyxidanthera barbulata</i> var. <i>brevifolia</i>	Well's pixie-mosss	Diapensiaceae	NC SC	UR	226

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
Quercus arkansana	Arkansas Oak	Fagaceae	AL AR	None (3C)	283
Quercus georgiana	Georgia oak	Fagaceae	AL GA SC	SR-T (3C)	78
Quercus graciliformis	slender oak	Fagaceae	TX	UR	
Quercus hinckleyi	Hinckley's oak	Fagaceae	TX	UR	
Quercus oglethorpensis	Oglethorpe's oak	Fagaceae	GA LA SC	UR	36
Quercus shumardii acerifolia	maple leaf Shumard's oak	Fagaceae	AR	UR	79
Quercus tardifolia	Chizos Mountains oak	Fagaceae	TX	UR	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number†</u>
<i>Randia portoricensis</i>	Puerto Rico indigo berry	Rubiaceae	PR	UR	
<i>Ranunculus fascicularis</i> var. <i>cuneiformis</i>	Kerr buttercup	Ranunculaceae	TX	UR	
<i>Ranunculus subcordatus</i>	heart-leaved buttercup	Ranunculaceae	NC	UR	
<i>Ravenia urbanii</i>	Urban ravenia	Rutaceae	PR	UR	
<i>Rhapidophyllum hystrix</i>	common needle-palm	Arecaceae	AL FL GA MS SC	SR-T (3C)	206 ^b
<i>Rhexia parviflora</i>	small-flowered meadow-beauty	Melastomataceae	FL GA	UR	145
<i>Rhexia salicifolia</i>	panhandle meadowbeauty	Melastomataceae	AL FL	UR	
<i>Rhipsalis baccifera</i>	mistle-toe cactus	Cactaceae	FL Mexico, SRI Lanka, Central America South America, West Indies	None (3C)	
<i>Rhododendron austrinum</i>	Florida azalea	Ericaceae	AL FL GA MS	SR-T (3C)	75
<i>Rhododendron bakeri</i>	Cumberland azalea	Ericaceae	AL GA KY NC TN VA	SR-T (3C)	277
<i>Rhododendron chapmanii</i>	Chapman's rhododendron	Ericaceae	FL	E	128 ^a
<i>Rhododendron prunifolium</i>	plumleaf azalea	Ericaceae	AL GA	UR	129
<i>Rhododendron vaseyi</i>	pink-shell azalea	Ericaceae	NC	SR-T (3C)	227
<i>Rhododon ciliatus</i>		Lamiaceae	TX	None (3C)	
<i>Rhus michauxii</i>	false poison sumac	Anacardiaceae	GA NC SC	UR	
<i>Rhynchosia cinerea</i>	brown-haired snoutbean	Fabaceae	FL	UR	76
<i>Rhynchospora crinipes</i>	Alabama beaked-rush	Cyperaceae	AL	UR	169
<i>Rhynchospora culix</i>	Georgia beaked-rush	Cyperaceae	FL GA	SR-T (3C)	274

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
Rhynchospora globularis saxicola	rock-loving globe beaked- rush	Cyperaceae	GA	UR	275
Rhynchospora punctata	pineland beaked-rush	Cyperaceae	FL GA	UR	276
Ribes echinellum	Florida gooseberry	Saxifragaceae	FL SC	UR	199 ^a
Rosa stellata	desert rose	Rosaceae	AZ NM TX	UR	
Roystonea elata	Florida royal-palm	Arecaceae	FL	UR	
Rubus duplaris	Shinner's blackberry	Rosaceae	TX	None (3C)	
Rudbeckia auriculata	eared coneflower	Asteraceae	AL	SR-T (3C)	5
Rudbeckia heliopsidis	sun-facing coneflower	Asteraceae	AL GA NC SC VA	UR	6
Rudbeckia nitida var. nitida		Asteraceae	FL GA	UR	
Rudbeckia triloba pinnatiloba	pinnate-lobed brown- eyed coneflower	Asteraceae	FL NC	UR	214
Ruellia drummondiana	Drummond's petunia	Acanthaceae	TX	None (3C)	
Rumex spiralis	winged dock	Polygonaceae	TX	None (3C)	
Ruppia anomala	yerba de zanja	Ruppiaceae	PR	None (3B)	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number†</u>
Sageretia minutifolia	tiny-leaved buckthorn	Rhamnaceae	AL FL GA MS SC	SR-T (3C)	247
Sagittaria fasciculata	bunched arrowhead	Alismataceae	NC SC	E	157
Salix floridana	Florida willow	Salicaceae	FL GA	UR	196 ^a
Salvia blodgettii	Blodgett's sage	Lamiaceae	FL	UR	
Salvia penstemonoides	big red sage	Lamiaceae	TX	UR	
Sarracenia oreophila	green pitcher plant	Sarraceniaceae	AL GA TN	E	198 ^a
Sarracenia psittacina	parrot pitcher-plant	Sarraceniaceae	AL FL GA LA MS	None (3C)	205 ^a
Sarracenia rubra ssp. alabamensis	Alabama cane-break pitcher-plant	Sarraceniaceae	AL	UR	197 ^a
Sarracenia rubra ssp. gulfensis		Sarraceniaceae	AL FL	None (3C)	
Sarracenia rubra ssp. jonesii	Jone's pitcher-plant	Sarraceniaceae	NC SC	UR	316 ^b
Sarracenia rubra ssp. rubra	sweet pitcher-plant	Sarraceniaceae	AL FL GA MS NC SC	None (3C)	
Sarracenia rubra ssp. wherryi	Wherry's cane-break pitcher-plant	Sarraceniaceae	AL MS	UR	
Saxifraga careyana	golden-eye saxifrage	Saxifragaceae	GA NC SC TN VA	UR	252
Saxifraga caroliniana	Carolina saxifrage	Saxifragaceae	GA NC TN VA WV	UR	253
Schisandra glabra	smooth magnolia-vine	Schisandraceae	AL AR FL GA LA MS NC SC TN	SR-T (3C)	37
Schizachyrium niveum	riparium autumgrass	Poaceae	FL GA	UR	293
Schizachyrium rhizomatum		Poaceae	FL	SR-E (3B)	
Schizaea germanii	tropical curly grass fern	Schizaeaceae	FL Cuba, Guadeloupe	UR	
Schoenolirion wrightii	Texas sunnysbell	Liliaceae	AL AR TX	SR-E (3C)	176

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
<i>Schoepfia arenaria</i>	sandy graytwig	Olacaceae	PR	UR	
<i>Schrankia portoricensis</i>	Puerto Rico sensitive-briar	Fabaceae	PR	UR	
<i>Schwalbea americana</i>	Americana chaff-seed	Scrophulariaceae	CT DE KY LA MA MD MS NJ NY SC TN VA	UR	306
<i>Scirpus ancistrochaetus</i>	Northeastern bullrush	Cyperaceae	MA NY PA VA VT	UR	
<i>Scirpus flaccidifolius</i>	reclining bullrush	Cyperaceae	NC VA	SR-T (3C)	
<i>Scleria doradodoensis</i>	Dorado nutrush	Cyperaceae	PR	UR	
<i>Scutellaria floridana</i>	Florida skullcap	Lamiaceae	FL	UR	94
<i>Scutellaria montana</i>	Large-flowered skullcap	Lamiaceae	GA TN	UR	95
<i>Scutellaria ocmulgee</i>	Macon skullcap	Lamiaceae	GA	UR	
<i>Scutellaria thieretii</i>	Thieretii skullcap	Lamiaceae	LA	UR	96
<i>Sedum nevii</i>	Nevius' stonecrop	Crassulaceae	AL GA TN	UR	50
<i>Sedum pusillum</i>	granite rock stonecrop	Crassulaceae	GA NC SC	UR	51
<i>Sedum robertsonianum</i>	Robert's stonecrop	Crassulaceae	TX	UR	
<i>Sedum rosea</i> var. <i>roanensis</i>		Crassulaceae	NC TN	UR	
<i>Selenia jonesii</i>	Jone's selenia	Brassicaceae	TX	SR-E (3C)	
<i>Senecio antennarifolius</i>		Asteraceae	MD PA VA WV	None (3C)	
<i>Senecio millefolium</i>	piedmont ragwort	Asteraceae	GA NC SC	SR-T (3C)	215
<i>Senecio warnockii</i>	Warnock's ragwort	Asteraceae	TX	UR	
<i>Sesuvium trianthemoides</i>	Texas sea purslane	Aizoaceae	TX	UR	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number</u>
<i>Seymeria havardii</i>	Eagle Pass seymeria	Scrophulariaceae	TX	UR	
<i>Shortia galacifolia</i> var. <i>brevistyla</i>		Diapensiaceae	GA NC SC	SR-E (3B)	
<i>Shortia galacifolia</i> var. <i>galacifolia</i>	milky-leaved Oconee bells	Diapensiaceae	GA NC SC VA	UR	170
<i>Sida rubromarginata</i>	red-margined sida	Malvaceae	FL	UR	
<i>Silene plankii</i>	Plank's catchfly	Caryophyllaceae	NM TX	SR-E (3C)	
<i>Silene polypetala</i>	fringed campion	Caryophyllaceae	FL GA	UR	126
<i>Silene regia</i>		Caryophyllaceae	AL AR GA IL IN KY MO OH OK	UR	
<i>Silphium brachiatum</i>	cumberland rosinweed	Asteraceae	AL TN	UR	71
<i>Silphium confertifolium</i>	southern rosinweed	Asteraceae	AL	UR	7
<i>Silphium integrifolium</i> var. <i>gattingeri</i>		Asteraceae	TN	SR-E (3B)	39
<i>Sium floridanum</i>	Florida water-parsnip	Apiaceae	FL	UR	158
<i>Smilax leptanthera</i>	piedmont greenbrier	Liliaceae	GA	UR	
<i>Solanum bahamense rugelii</i>	Rugel's bahama horse-nettle	Solanaceae	FL	UR	
<i>Solanum carolinense</i> var. <i>floridanum</i>		Solanaceae	FL	UR	211
<i>Solanum carolinense hirsutum</i>	stiff-haired carolina horse-nettle	Solanaceae	GA	UR	
<i>Solanum conocarpum</i>	Virgin Island horse-nettle	Solanaceae	VI	UR	
<i>Solanum drymophilum</i>	arborescent horse-nettle	Solanaceae	PR	UR	
<i>Solanum mucronatum</i>	Caribbean horse-nettle	Solanaceae	PR VI	UR	
<i>Solanum woodburyi</i>	Woodbury's nightshade	Solanaceae	PR	UR	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
<i>Solidago albopilosa</i>	white-haired goldenrod	Asteraceae	KY	UR	125
<i>Solidago arguta</i> var. <i>harrissii</i>		Asteraceae	MD PA VA WV	None (3C)	
<i>Solidago lindheimeriana</i>		Asteraceae	TX	None (3C)	
<i>Solidago mollis</i> var. <i>angustata</i>		Asteraceae	TX	SR-T (3C)	
<i>Solidago porteri</i>	Porter's goldenrod	Asteraceae	GA NC	UR	
<i>Solidago pulchra</i>	wand-like goldenrod	Asteraceae	NC	UR	266
<i>Solidago shortii</i>	Short's goldenrod	Asteraceae	KY	UR	40
<i>Solidago spithamea</i>	Blue Ridge goldenrod	Asteraceae	NC TN	UR	216 ^a
<i>Solidago verna</i>	spring goldenrod	Asteraceae	NC SC	UR	267
<i>Sophora gypsophila</i> var. <i>guadalupensis</i>	Guadalupe Mountains sophora	Fabaceae	NM TX	UR	
<i>Sphenostigma coelestina</i>	Bartram's ixia	Iridaceae	FL	UR	86
<i>Spigelia gentianoides</i>	gentian pinkroot	Loganiaceae	FL	UR	180
<i>Spigelia loganioides</i>	Florida pinkroot	Loganiaceae	FL	UR	181
<i>Spigelia texana</i>	Texas pinkroot	Loganiaceae	TX	UR	
<i>Spiranthes lanceolata</i> var. <i>paludicola</i>	red-flowered ladies'-tresses	Orchidaceae	FL	UR	
<i>Spiranthes parksii</i>	Narasot ladies'-tresses	Orchidaceae	TX	E	
<i>Spiranthes polyantha</i>	Florida Key ladies' tresses	Orchidaceae	FL PR Bahamas, Dominican Republic, Guatemala, Mexico	UR	
<i>Sporobolus teretifolius</i>	wireleaf dropseed	Poaceae	GA NC SC	UR	297
<i>Stachys lythroides</i>	Tallahassee hedge-nettle	Lamiaceae	FL	UR	97
<i>Stahlia monosperma</i>	black cobana	Fabaceae	PR Dom. Republic	UR	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number†</u>
<i>Steironema laevigata</i>	fringed loeastripe	Primulaceae	AL AZ CO CT FL ID LA MA ME MS MT NH NM OR RI TX VT WA Canada, (British Columbia, Nova Scotia)	None (3C)	
<i>Stenandrium fascicularis</i>	Texas stenandrium	Acanthaceae	TX Mexico	SR-T (3C)	
<i>Stillingia sylvatica</i> ssp. <i>tenuis</i>	slender queen's delight <i>stillingia</i>	Euphorbiaceae	FL	UR	
<i>Streptanthus bracteatus</i>	contact mine twistflower	Brassicaceae	TX	UR	
<i>Streptanthus carinatus</i>	lyre-leaved twistflower	Brassicaceae	TX	UR	
<i>Streptanthus cutleri</i>	Cutler's twistflower	Brassicaceae	TX	UR	
<i>Streptanthus sparsiflorus</i>	sparsely-flowered twist- flower	Brassicaceae	TX	UR	
<i>Streptanthus squamiformis</i>	prairie twistflower	Brassicaceae	AR OK	UR	220
<i>Styrax platanifolia</i> var. <i>stellata</i>	sycamore-leaved snowbell	Styracaceae	TX	SR-E (3C)	
<i>Styrax portoricensis</i>	Puerto Rico snowbell	Styracaceae	PR	UR	
<i>Styrax texana</i>	Texas snowbell	Styracaceae	TX	UR	
<i>Styrax youngae</i>	Davis Mountain snowbell	Styracaceae	TX Mexico	UR	
<i>Suaeda duripes</i>	hard-toe seepweed	Chenopodiaceae	TX	UR	
<i>Sullivantia sullivantia</i>	Ohio sullivantia	Saxifragaceae	IN KY OH	SR-T (3C)	
<i>Symphoricarpos guadalupensis</i>	McKittrick snowberry	Caprifoliaceae	TX	UR	
<i>Synandra hispida</i>	gyandotte beauty synandra	Lamiaceae	AL IL IN KY NC OH TN VA WV	UR	98

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
<i>Talinum appalachianum</i>	Appalachian fame-flower	Portulacaceae	AL	UR	188
<i>Talinum calcaricum</i>	Lime fame-flower	Portulacaceae	AL TN	UR	299
<i>Talinum mengesii</i>	Menge's fame-flower	Portulacaceae	AL GA	SR-T (3C)	300
<i>Taxus floridana</i>	Florida yew	Taxaceae	FL	UR	202 ^a
<i>Tectaria amesiana</i>	Ame's halberd-fern	Polypodiaceae	FL Bahamas	UR	
<i>Tephrosia angustissima</i>	narrow-leaved hoary-pea	Fabaceae	FL	UR	
<i>Tephrosia mohrii</i>	pineland hoary-pea	Fabaceae	AL FL GA	UR	77
<i>Ternstroemia luquillensis</i>	Luquillo Mountain ternstroemia	Theaceae	PR	UR	
<i>Ternstroemia subsessilis</i>	Puerto Rico ternstroemia	Theaceae	PR	UR	
<i>Thalictrum cooleyi</i>	Cooley's meadow-rue	Ranunculaceae	FL NC	UR	192
<i>Thalictrum debile</i>	southern meadow-rue	Ranunculaceae	AL AR GA MS TX	None (3C)	
<i>Thalictrum texanum</i>		Ranunculaceae	TX	UR	
<i>Thelocactus bicolor</i> var. <i>flavidispinus</i>	yellow-spine straw thelocactus	Cactaceae	TX Mexico	UR	
<i>Thelypodium tenue</i>	Fresno Creek thelypody	Brassicaceae	TX	UR	
<i>Thelypodium texanum</i>	Texas thelypody	Brassicaceae	TX	SR-E (3C)	
<i>Thelypteris pilosa</i> var. <i>alabamensis</i>		Polypodiaceae	AL	UR	164
<i>Tillandsia lineatispica</i>	rock tillandsia	Bromeliaceae	PR VI	UR	
<i>Torreya taxifolia</i>	Florida torreya	Taxaceae	FL GA	UR	203 ^a
<i>Tradescantia edwardsiana</i>	plateau spiderwort	Commelinaceae	TX	UR	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number†</u>
<i>Tradescantia wrightii</i>	Wright's spiderwort	Commelinaceae	NM TX	SR-T (3C)	
<i>Tragia nigricans</i>	dark noseburn	Euphorbiaceae	TX	SR-T (3C)	
<i>Tragia saxicola</i>	Florida Key noseburn	Euphorbiaceae	FL	UR	
<i>Trichillia triacantha</i>	three-spine bitterwood	Meliaceae	PR	UR	
<i>Trifolium stoloniferum</i>	running buffalo clover	Fabaceae	IL IN KY KS MO OH WV	UR	
<i>Trifolium virginicum</i>		Fabaceae	MD PA VA WV	UR	
<i>Trillium persiciens</i>	persistent trillium	Liliaceae	GA SC	E	177 ^a
<i>Trillium pusillum ozarkanum</i>	Ozark least trillium	Liliaceae	AR KY MO TN	UR	140C
<i>Trillium pusillum pusillum</i>	common least trillium	Liliaceae	AL MS NC SC TN	UR	140A
<i>Trillium pusillum</i> var. <i>virginianum</i>	Virginia least trillium	Liliaceae	MD VA WV	SR-E (3C)	140B
<i>Trillium texanum</i>	Texas trillium	Liliaceae	TX	UR	141
<i>Triphora craigheadii</i>	Craighead's pogonia	Orchidaceae	FL	UR	
<i>Triphora latifolia</i>	broad-leaved pogonia	Orchidaceae	FL	UR	
<i>Tripsacum floridanum</i>	Florida gramagrass	Poaceae	FL	UR	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number†</u>
Urtica chamaedryoides var. runyonii		Urticaceae	TX	UR	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
Vaccinium sempervirens		Ericaceae	SC	UR	
Valeriana texana	Guadalupe valerian	Valerianaceae	NM TX	SR-T (3C)	
Valerianella texana	Edward's plateau corn-salad	Valerianaceae	TX	SR-E (3C)	
Veratrum woodii	Wood's false helleborne	Liliaceae	AR FL GA IL IN IA KY MO NC OH OK TN TX	SR-T (3C)	178
Verbena maritima	costal vervain	Verbenaceae	FL	UR	307
Verbena tampensis	Tampa vervain	Verbenaceae	FL	UR	204
Verbesina chapmanii	Chapman's crowbeard	Asteraceae	FL	UR	72
Verbesina heterophylla	variable-leaf crownbeard	Asteraceae	FL	UR	73
Vernonia borinquensis	Puerto Rico ironweed	Asteraceae	PR	UR	
Vernonia pulchella	Georgia ironweed	Asteraceae	GA	SR-T (3C)	8
Viburnum bracteatum	southeastern viburnum	Caprifoliaceae	AL GA	UR	222
Vicia ocalensis	Ocala betch	Fabaceae	FL	UR	57
Vicia reverchonii	Harry pod vetch	Fabaceae	OK TX	SR-E (3B)	
Viguiera porteri	Porter's golden-eye	Asteraceae	AL GA	SR-T (3C)	9
Viola egglestonii	Eggleston's violet	Violaceae	AL GA KY TN	SR-T (3C)	255

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number†</u>
Walsteinia lobata	piedmont strawberry	Rosaceae	GA SC	UR	249
Warea amplexifolia	clasping warea	Brassicaceae	AL FL	UR	47
Warea carteri	Carter's warea	Brassicaceae	FL	UR	221
Warea sessilifolia	sessile-leaved warea	Brassicaceae	AL FL	SR-T (3C)	48 ^a
Willkommia texana	Texas wilkommia	Poaceae	TX	UR	

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number†</u>
Xyris drummondii	Drummond's yellow-eyed grass	Xyridaceae	AL FL GA MS	UR	153
Xyris isoetifolia	quillwort yellow-eyed grass	Xyridaceae	FL	UR	154
Xyris longisepala	Kral's yellow-eyed grass	Xyridaceae	AL FL	UR	155
Xyris scabrifolia	Harper's yellow-eyed grass	Xyridaceae	AL FL GA MS	UR	156
Xyris tennesseensis	Tennessee yellow-eyed grass	Xyridaceae	GA TN	UR	308

<u>Scientific name</u>	<u>Common name</u>	<u>Family</u>	<u>Dist.</u>	<u>Status*</u>	<u>Number+</u>
Zamia integrifolia	Florida coontie	Cycadaceae	FL GA	SR-E (3C)	52 ^a
Zanthoxylum parvum	shinner's tickle-tongue	Rutaceae	TX	UR	
Zanthoxylum thomsonianum	St. Thomas prickly-ash	Rutaceae	PR VI	UR	
Zephyranthes simpsonii	rein zephyrlily	Liliaceae	FL GA SC	SR-T (3C)	142A
Zephyranthes treatiae	easter zephyrlily	Liliaceae	FL	SR-T (3C)	142B
Zizania texana	Texas wild-rice	Poaceae	TX	E	
Zizia latifolia	Bristol golden-alexanders	Apiaceae	FL	UR	

LIST OF THREATENED, ENDANGERED AND SENSITIVE PLANT
SPECIES OF THE SOUTHEASTERN UNITED STATES
(Arranged Numerically by Species Description Guide Number)

- #1 Lesquerella densipila Rollins; Duck River bladderpod
- #2 Asclepias viridula Chapm.; southern milkweed
- #3 Aster spinulosus Chapm.; pine-woods aster
- #4 Prenanthes roanensis (Chick.) Chick.; piedmont rattlesnake-root
- #5 Rudbeckia auriculata (Perdue) Kral; eared coneflower
- #6 Rudbeckia heliopsisidis T. & G.; sun-facing coneflower
- #7 Silphium confertifolium Small; southern rosinweed
- #8 Vernonia pulchella Small; Georgia ironweed
- #9 Viguiera porteri (A. Gray) Blade; Porter's golden-eye
- #10 Leavenworthia alabamica Rollins var. alabamica; Alabama glade-cress
- #11 Leavenworthia alabamica Rollins var. brachystyla Rollins; short-styled glade-cress
- #12 Leavenworthia crassa Rollins var. crassa; fleshy-fruited glade-cress
- #13 Leavenworthia crassa Rollins var. elongata Rollins; Falkville glade-cress
- #14 Leavenworthia exigua Rollins var. exigua; Tennessee glade-cress
- #15 Leavenworthia exigua Rollins var. laciniata Rollins; Sheperdsville glade-cress
- #16 Leavenworthia exigua Rollins var. lutea Rollins; pasture glade-cress
- #17 Leavenworthia stylosa Gray; limestone glade-cress
- #18 Leavenworthia torulosa Gray; string-of-beads glade-cress
- #19 Arenaria fontinalis (Short and Peters) Shinnery; pioneer sandwort
- #20 Lechea cernua Small; nodding pinweed
- #21 Lechea divaricata Shuttle; pine pinweed
- #22 Bonamia grandiflora (A. Gray) Heller; large-flowered bonamia
- #23 Carex amplisquama F. J. Hermann; Fort Mountain sedge
- #24 Carex baltzellii Chapm. ex Dewey; Baltzell's sedge
- #25 Carex chapmannii Steud.; Chapman's sedge
- #26 Carex purpurifera Machenzie; purple sedge
- #27 Cymophyllus fraseri (Andr.) Mackenzie; Fraser's sedge
- #28 Fimbristylis perpusilla Harper; Vahl's fimbry
- #29 Elliottia racemosa Ell.; common southern plume
- #30 Lachnocaulon beyrichianum Sporleder ex Korn.; southern bog buttons
- #31 Eriocaulon kornickianum Van Heurck & Muell. - Arg.; small-headed pipewort
- #32 Euphorbia telephoides Chapm.; telephus spruce
- #33 Apios priceana B. L. Robins.; Price's groundnut
- #34 Astragalus tennesseensis A. Gray; Tennessee milkvetch
- #35 Petalostemum foliosum A. Gray; leafy prairie-clover
- #36 Quercus oglethorpensis Duncan; Oglethorpe's oak
- #37 Schisandra glabra (Brickell) Rehder; smooth magnolia vine
- #38 Marshallia ramosa Beadle & F. E. Boynt.; southern barbara's-buttons
- #39 Silphium integrifolium Mchx. var. gattereri Perry; Gatterer's entire-leaved rosinweed
- #40 Solidago shortii T. & G.; Short's goldenrod
- #41 Arabis perstellata (complex) Braun; prairie rock-cress
- #42 Lesquerella globosa (Desv.) Wats.; globose bladderpod
- #43 Lesquerella lescurii (Gray) Wats.; Nashville bladderpod
- #44 Lesquerella lyrata Rollins; lyrate bladderpod
- #45 Lesquerella perforata Rollins; Spring Creek bladderpod
- #46 Lesquerella stonensis Rollins; Stone's River bladderpod
- #47 Warea amplexifolia (Nutt.) Nutt.; clasping warea

- #48 Warea sessilifolia Nash; sessile-leaved warea
- #49 Arenaria alabamensis (McCormick, Bozeman & Spongberg) Wyatt; Alabama sandwort
- #50 Sedum nevii A. Gray; Nevius' stonecrop
- #51 Sedum pusillum Michx.; granite rock stonecrop
- #52 Zamia integrifolia Ait.; Florida coontie
- #53 Croton alabamensis E. A. Smith; Alabama croton
- #54 Phyllanthus liebmannianus Muell. Arg. ssp. platylepis (Small) Webster;
Florida leaf flower
- #55 Baptisia arachnifera Duncan; hairy wild-indigo
- #56 Baptisia simplicifolia Croom; coastal-plain wild-indigo
- #57 Vicia ocalensis Godfrey & Kral; Ocala vetch
- #58 Castanea ozarkensis W. W. Ashe; Ozark chinquapin
- #59 Gentiana pennelliana Fern.; wiregrass gentian
- #60 Conradina brevifolia Shinners; short-leaved rosemary
- #61 Conradina verticillata Jennison; whorled-leaved rosemary
- #62 Dicerandra frutescens Shinners; shrubby dicerandra
- #63 Dicerandra immaculata Lakela; spotless-petaled dicerandra
- #64 Hedeoma graveolens Chapm.; mock pennyroyal
- #65 Macbridea alba Chapm.; white birds-in-a-nest
- #66 Linum westii C. M. Rogers; West's flax
- #67 Iliamna remota Greene; Kankakee globe-mallow
- #68 Hartwrightia floridana A. Gray ex S. Watson; Florida hartwrightia
- #69 Helianthus eggertii Small; Eggert's sunflower
- #70 Heterotheca flexuosa (Nash) Harms; bent golden-aster
- #71 Silphium brachiatum Gattinger; cumberland rosinweed
- #72 Verbesina chapmanii J. R. Coleman; Chapman's crownbeard
- #73 Verbesina heterophylla (Chapm.) A. Gray; variable-leaf crownbeard
- #74 Paronychia chartacea Fernald; paperlike nail-wort
- #75 Rhododendron austrinum (Small) Rehder; Florida azalea
- #76 Rhynchosia cinerea Nash; brown-haired snoutbean
- #77 Tephrosia mohrii (Rydb.) Godfrey; pineland hoary-pea
- #78 Quercus georgiana M. A. Curtis; Georgia oak
- #79 Quercus shumardii Buckley var. acerifolia Palmer; maple-leaf Shumard's oak
- #80 Myriophyllum laxum Shuttlw. ex Chapm.; piedmont water-milfoil
- #81 Fothergilla gardeni Murr.; dwarf witch-alder
- #82 Phacelia dubia (L.) Trelease var. georgiana McVaugh; Georgia small-flowered phacelia
- #83 Hypericum cumulicola (Small) P. Adams; highlands scrub hypericum
- #84 Hypericum edisonianum (Small) Adams & Robson; Edison's St. John's-wort
- #85 Nemastylis floridana Small; fall-flowering peatleaf
- #86 Sphenostigma coelestina (Bartr. ex Willd.) R. C. Foster; Bartram's ixia
- #87 Juncus gymnocarpus Coville; Coville's rush
- #88 Calamintha ashei (Weatherby) Shinners; Ash's savory
- #89 Calamintha dentata Chapm.; toothed savory
- #90 Conradina grandiflora Small; large-flowered rosemary
- #91 Dicerandra odoratissima Harper; rose dicerandra
- #92 Physostegia veroniciformis Small; Veronica dragon-head
- #93 Pycnanthemum floridanum Nash ex Grant & Epling; Florida mountain-mint
- #94 Scutellaria floridana Chapm.; Florida skullcap
- #95 Scutellaria montana Chapm.; large-flowered skullcap
- #96 Scutellaria thieretii Shinners; Thieretii skullcap
- #97 Stachys lythroides Small; Tallahassee hedge-nettle

- #98 Synandra hispidula (Michx.) Baill.; gyandotte beauty synandra
- #99 Lindera melissaefolium (Walt.) Blume; swamp spicebush
- #100 Persea humilis Nash; dwarf redbay persea
- #101 Litsea aestivalis (L.) Fern.; Pond spice, pond bush
- #102 Balduina atropurpurea Harper; purple balduina
- #103 Aster plumosus Small; plumose aster
- #104 Brickellia cordifolia Ell.; Flyr's brickell-bush
- #105 Cacalia diversifolia T. & G.; variable-leaved indian-plantain
- #106 Justicia cooleyi Monachino and Leonard; Cooley's water-willow
- #107 Justicia crassifolia (Chapman) Small; thick-leaved water-willow
- #108 Asimina tetramera Small; opposum pawpaw
- #109 Deeringothamnus pulchellus Small; slimpetal pawpaw
- #110 Deeringothamnus rugelii (Robins.) Small; Rugel's pawpaw
- #111 Eryngium cunefolium Small; wedge-leaved button-snake root
- #112 Oxypolis greenmanii Mathais & Constance; giant water cowbane
- #113 Ptilimnium fluviatilis (Rose) Mathias; river bishop-weed
- #114 Ilex amelanchier M. A. Curtis; serviceberry holly
- #115 Ilex opaca L. var. arenicola (Ashe) Ashe; sand-loving American holly
- #116 Hexastylis speciosa Harper; Harper's heartleaf
- #117 Aster pinifolius E. J. Alexander; pale-violet aster
- #118 Echinacea laevigata (Boynt & Beadle) Blake; smooth purple coneflower
- #119 Echinacea tennesseensis (Beadle) Small; Tennessee purple coneflower
- #120 Helianthus carnosus Small; lake-side sunflower
- #121 Jamesianthus alabamensis S. F. Blake & E. E. Sherff; Alabama jamesianthus
- #122 Liatris ohlingerae (Blake) Robinson; Florida gay-feather
- #123 Liatris provincialis Godfrey; Godfrey's gay-feather
- #124 Marshallia mohrii Beadle and Boynton; Mohr's barbara's-buttons
- #125 Solidago albopilosa E. L. Braun; white-haired goldenrod
- #126 Silene polypetala (Walt.) Fern. & Schub.; fringed campion
- #127 Dionaea muscipula Ellis; common venus'-flytrap
- #128 Rhododendron chapmanii A. Gray; Chapman's rhododendron
- #129 Rhododendron prunifolium (Small) Millais; plumleaf azalea
- #130 Baptisia calycosa Canby; pineland wild-indigo
- #131 Lupinus westianus Small; panhandle lupine
- #132 Pinguicula ionantha Godfrey; violet-flowered butterwort
- #133 Pinguicula planifolia Chapm.; Chapman's butterwort
- #134 Harperocallis flava McDaniel; yellow-petaled Harper's beauty
- #135 Hymenocallis coronaria (LeConte) Kunth; stream-bank spiderlily
- #136 Lilium grayii S. Wats; Gray's lily
- #137 Lilium iridollae M. G. Henry; panhandle lily
- #138 Nolina atopocarpa Bartlett; Florida beargrass
- #139 Nolina brittoniana Nash; Britton's beargrass
- #140 Trillium pusillum Michx. (complex); Wake robin
- #141 Trillium texanum Buckley; least trillium
- #142 Zephyranthes simpsonii Chapm.; rain zephyrlily
- #143 Cuphea aspera Chapm.; tropical waxweed
- #144 Illicium parviflorum Michx. ex Vent.; yellow anisetree
- #145 Rhexia parviflora Chapm.; small-flowered meadowbeauty
- #146 Calamovilfa arcuata K. E. Rogers; cumberland reedgrass
- #147 Phlox pulchra Wherry; Wherry's phlox
- #148 Polygonella ciliata Meisn. in DC. var. basiramea (Small) Horton; hairy jointweed

- #149 Polygonella macrophylla Small; large-leaved jointweed
- #150 Polygonella myriophylla (Small) Horton; woody wireweed
- #151 Cimicifuga rubifolia Kearney; Appalachian bugbane
- #152 Croomia pauciflora (Nutt.) Torr.; few-flowered croomia
- #153 Xyris drummondii Malme; Drummond's yellow-eyed grass
- #154 Xyris isoetifolia Kral; quillwort yellow-eyed grass
- #155 Xyris longisepala Kral; Kral's yellow-eyed grass
- #156 Xyris scabrifolia Harper; Harper's yellow-eyed grass
- #157 Sagittaria fasciculata E. O. Beal; bunched arrowhead
- #158 Sium floridanum Small; Florida water-parsnip
- #159 Hexastylis naniflora Blomquist; dwarf-flowered heartleaf
- #160 Matelea alabamensis (Vail) Woodson; Alabama milkvine
- #161 Thelypteris pilosa (Mort & Gal) Crawford var. alabamensis
Crawford; streak-sorus fern
- #162 Phyllitis scolopendrium (L.) Newm. var. americana Fern;
American hart's-tongue fern
- #163 Coreopsis intermedia Sherff; golden-wave tickseed
- #164 Helianthus smithii Heiser; Smith's sunflower
- #165 Heterotheca ruthii (Small) Harms; Ruth's telegraph plant
- #166 Draba aprica Beadle; open-ground whitlow-grass
- #167 Hudsonia ericoides L. ssp. montana (Nutt.) Nickerson & Skog;
golden mountain heather
- #168 Lechea maritima Legg. var. virginica Hodgdon; virginian pinweed
- #169 Rhynchospora crinipes Gale; Alabama beaked-rush
- #170 Shortia galacifolia T. & G.; Ocone bells
- #171 Kalmia cuneata Michx.; white-wicky laurel
- #172 Croton elliotii Chapm.; Elliott's croton
- #173 Hymenophyllum tunbridgense (L.) Smith; Tunbridge fern
- #174 Isoetes louisianensis Thieret; Louisiana quillwort
- #175 Pycnanthemum curvipes (Greene) Grant & Epling; Tennessee mountain-mint
- #176 Schoenolirion wrightii Sherman; Texas sunnybell
- #177 Trillium persistens Duncan; persistent trillium
- #178 Veratrum woodii Robbins in Wood; Woods' false helleborne
- #179 Linum carteri Small var. smallii Rodgers; Carter's large-flowered flax
- #180 Spigelia gentianoides Chapm.; gentian pinkroot
- #181 Spigelia loganioides (T. & G. ex Engl.) A.D.C.; Florida pinkroot
- #182 Plantago cordata Lam.; heart-leaved plantain
- #183 Andropogon arctatus Chapm.; pine-woods bluestem
- #184 Calamovilfa curtissii (Vasey) Vasey; Curtis' reedgrass
- #185 Glyceria nubigena Anders.; Smoky Mountain manna-grass
- #186 Polygala lewtonii Small; Lewton's milkwort
- #187 Eriogonum harperi Goodman; Harper's long-leaved wild-buckwheat
- #188 Talinum appalachianum W. Wolf; Appalachian fame-flower
- #189 Aquilegia canadensis L. var. australis (Small) Munz; southern columbine
- #190 Clematis addisonii Britt.; Addison's leather-flower
- #191 Clematis viticaulis Steele; grape leather-flower
- #192 Thalictrum cooleyi Ahles; Cooley's meadow-rue
- #193 Geum radiatum Michx.; spreading avens
- #194 Prunus geniculata Harper; scrub plum
- #195 Hedyotis nigricans (Lam.) Fosb. var. pulvinata (Small) Fosb.; mat-forming
narrow-leaved bluet

- #196 Salix floridana Chapm.; Florida willow
- #197 Sarracenia alabamensis Case & Case; Alabama cane-break pitcher-plant
- #198 Sarracenia oreophila (Kearny) Wherry; green pitcher-plant
- #199 Ribes echinellum (Coville) Rehder; Florida gooseberry
- #200 Amphianthus pusillus Torrey; little amphianthus
- #201 Solanum carolinense L. var. floridanum Chapm.; Florida horse-nettle
- #202 Taxus floridana Chapm.; Florida yew
- #203 Torreya taxifolia Arn.; Florida torreya
- #204 Verbena tampensis Nash; Tampa vervain
- #205 Sarracenia psittacina Michx.; parrot pitcher plant
- #206 Rhaphidophyllum hystrix (Pursh) H. Wendl & Drude; common needle palm
- #207 Ophioglossum palmatum L.; hands adder's-tongue fern
- #208 Matelea floridana (Vail) Woodson; Florida milkvine
- #209 Cacalia rugelia (Shuttlw. ex Chapm.) Barkley & Crong.; Rugel's indian-plantain
- #210 Coreopsis latifolia Michx.; broad-leaved tickseed
- #211 Helianthus debilis Nutt. ssp. vestitus (Wats.) Heller; hairy cucumber-leaf sunflower
- #212 Helianthus schweinitzii T. & G.; Schweinitz's sunflower
- #213 Liatris helleri T.C. Porter; Heller's gay feather
- #214 Rudbeckia triloba L. var. pinnatiloba T. & G.; pinnatelobed brown-eyed coneflower
- #215 Senecio millefolium T. & G.; Piedmont ragwort
- #216 Solidago spithamea Curtis; Blue Ridge golden rod
- #217 Betula uber (Ashe) Fern.; Virginia round-leaf birch
- #218 Onosmodium molle Michx.; soft-hairy false-gromwell
- #219 Leavenworthia aurea Torr.; golden glade-cress
- #220 Streptanthus squamiformis Goodman; prairie twistflower
- #221 Warea carteri Small; Carter's warea
- #222 Viburnum bracteatum Rehd.; southeastern viburnum
- #223 Carex biltmoreana MacKenzie; Biltmore's sedge
- #224 Carex latebracteata Waterfall; Waterfall's sedge
- #225 Carex misera Buckl. wretched sedge
- #226 Pyxidanthra brevifolia Wells; Well's pixie-moss
- #227 Rhododendron vaseyi Gray; shell-pink azalea
- #228 Euphorbia discoidalis Chapman
- #229 Baptisia megacarpa Chapm. ex Torr; streamside wild indigo
- #230 Clitoria fragrans Small; sweet-scented butterfly pea
- #231 Juncus caesariensis Cor.; New Jersey rush
- #232 Juncus georgianus Coville; Georgia rush
- #233 Conradina glabra Shinnery; panhandle rosemary
- #234 Lythrum curtissii Fernald; Curtiss' lythrum
- #235 Lythrum flagellarea Shuttlw.; lowland lythrum
- #236 Magnolia ashei Weatherby; Ashe magnolia
- #237 Callirhoe papaver (Cav.) Gray var. bushii (Fern.) waterf.; Bush's woods poppy-mallow
- #238 Nuphar luteum (L.) Sibth. & Sm. ssp. ulvaceum (Miller & Standl.) Beal; Florida cowlily
- #239 Chionanthus pygmaeus Small; pygmy fringe-tree
- #240 Ctenium floridanum (Hitchc.) Hitchc.; Florida orange-grass
- #241 Panicum hirstii Swallen; Hirst's panic-grass
- #242 Panicum lithophilum Swallen; Swallen's panic-grass
- #243 Portulacca smallii P. Wils.; Small's purslane
- #244 Clematis catesbyana Pursh; old man's beard virgin bower.
- #245 Delphinium alabamicum Kral; Alabama larkspur
- #246 Delphinium newtonianum D. M. Moore; Newton's larkspur
- #247 Sageretia minutiflora (Michx.) Trel.; tiny-leaved buckhorn

- #248 Geum geniculatum Michx.; bent avens
- #249 Waldsteinia lobata (Baldw.) T. & G.; Piedmont strawberry
- #250 Nestronia umbellula Rat.; common nestronia
- #251 Heuchera arkansana Rydb.; Arkansas alumroot
- #252 Saxifraga careyana Gray; golden-eye saxifrage
- #253 Saxifraga caroliniana Gray; Carolina saxifrage
- #254 Penstemon dissectus Ell.; dissected beardtongue
- #255 Viola egglestonii Brainerd; Eggleston's violet
- #256 Justicia mortuifluminis Fernald; dead water water-willow
- #257 Oxypolis canbyi (Coult. & Rose) Fern.; Canby's cowbane
- #258 Ptilimnium nodosum (Rose) Mathias; piedmont bishop-weed
- #259 Hexastylis contracta Blomquist; Southern heartleaf
- #260 Hexastylis lewisii (Fernald) Blomquist & Oosting; Lewis's heartleaf
- #261 Aster avitus Alexander; Alexander's rock aster
- #262 Eupatorium luciae-brauniae Fernald; Braun throughtwort
- #263 Eupatorium saltuense Fernald; pasture throughwort
- #264 Helianthus glaucophyllus D. M. Smith; white-leaved sunflower
- #265 Polymnia laevigata Beadle; Tennessee leafcup
- #266 Solidago pulchra Small; wand-like goldenrod
- #267 Solidago verna M. A. Curtis ext. T. & G.; spring goldenrod
- #268 Lobelia gattingeri A. Gray; Gattinger's lobelia
- #269 Arenaria cumberlandensis Wofford & Kral; Cumberland sandwort
- #270 Geocarpon minimum K. K. MacKenzie; little geocarpon
- #271 Paxistima canbyi Gray; Canby's mountain-lover
- #272 Cuscuta harperi Small; Harper's dodder
- #273 Cyperus granitophilus McVaugh; granite-loving flatsedge
- #274 Rhynchospora culixa Gale; Georgia beaked-rush
- #275 Rhynchospora globularis (Chapm.) Small; var. saxicola (Small) Kukenthal
rock-loving glove beaked-rush
- #276 Rhynchospora punctata Ell.; pineland beaked-rush
- #277 Rhododendron bakeri (Lemmon & McKay) Hume; Cumberland azalea
- #278 Euphorbia exserta (Small) Coker; exserted-fruited spurge
- #279 Baptisia hirsuta (Small); hairy wild-indigo
- #280 Petalostemon gattingeri Heller; Gattinger's prairie-clover
- #281 Psoralea subacaulis T. & G.; southern scarf-pea
- #282 Coreopsis pulchra F. Boynton in Small; beautiful tickseed
- #283 Quercus arkansana Sargent; Arkansas oak
- #284 Hypericum lissophloeus P. Adams; smooth-bark St. John's wort
- #285 Monarda stipitoglandulosa Waterfall; striped-gland bee-balm
- #286 Physostegia leptophylla Small; slender-leaved dragon-head
- #287 Leitneria floridana Chapm.; Florida corkwood
- #288 Oenothera pilosella Raf. ssp. sessilis (Pennell) Straley; coastal evening-primrose
- #289 Plantanthera flava (L.) Lindl.; southern rein-orchid
- #290 Plantanthera integra (Nutt.) Gray ex. Beck; yellow fringeless orchid
- #291 Plantanthera integrilabia (Correll) Luer; white fringeless orchid
- #292 Plantanthera peramoena (Gray) Gray; purple fringeless orchid
- #293 Schizachyrium niveum (Swallen) Gould; riparium autumngrass
- #294 Elymus svensonii Church; Svenson's wild-rye
- #295 Manisuris tuberculosa Nash; piedmont joint-grass
- #296 Panicum nudicaule Vasey; Naked-stemmed panic grass
- #297 Sporobolus teretifolius Harper; Wireleaf dropseed
- #298 Phlox bifida Beck ssp. stellaria (Gray) Wherry; Starwort cleft phlox
- #299 Talinum calcaricum Ware; lime fame-flower

- #300 Talinum mengesii W. Wolf; Menge's fame-flower
- #301 Lysimachia asperuliaefolia Poirrett; Carolina loosestrife
- #302 Agrimonia incisa T. & G.; incised groove bur
- #303 Houstonia montana (Chickering) Small; Mountain bluet
- #304 Agalinis pseudaphylla (Pennell) Pennell; False-leaved false-fox-glove
- #305 Aureolaria patula (Chapm.) Pennell; spreading foxgloves
- #306 Schwalbea americana L.; American chaff-seed
- #307 Verbena maritima Small; Coastal vervain
- #308 Xyris tennesseensis Kral; Tennessee yellow-eyed-grass
- #309 Calyptrinema rivalis (O.F. Cook) Bailey; Manac palm
- #310 Buxus vahlia (Baill.) Britt; Vahl's boxwood
- #311 Cereus eriophorus fragrans (Small) L. Benson; Fragrant Florida cereus
- #312 Cereus gracilis aboriginum (Small) L. Benson; Original prickly-apple cereus
- #313 Cereus robinii L. Benson; Tree cactus cereus
- #314 Cassia mirabilis (Pollard) Urban; Puerto Rico senna
- #315 Isotria medeoloides (Pursh) Raf.; Small-whorled pogonia
- #316 Sarracenia rubra jonesii (Wherry) Wherry; Jones' pitcher plant
- #317 Goetzea elegans Wydler; Malabuey
- #318 Arenaria godfreyi Shinnars; Godfrey's sandwort

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ASCLEPIADACEAE

Asclepias viridula Chapm.; southern milkweed, Milkweed

Technical Description

Perennial herb from a large, elongate-oblong, vertical rootstock.

Stems.--Spreading or erect, 1-several, slender and wand-like, 3-6 dm long, greenish or tinted with purple toward the base, terete, smooth other than for a vertical line of low, weak, whitish hairs between nodes.

Leaves.--Opposite, linear, 5-10 cm long, mostly 2-3 mm broad, spreading-ascending, broadening slightly toward the acute tips, smooth or with some roughening toward and along the margin above, 1-nerved.

Inflorescence.--Umbels from axils of all or most upper leaf pairs, on slender, sparsely puberulent peduncles between 1 and 2 cm long, with involucre bracts 2-3 mm long, narrowly triangular, scabrous-margined, with rays numerous, between 1 and 2 cm long, angulate, purplish on the backs, greenish and puberulent on a line within.

Flowers.--Symmetrical, smallish, the calyx lobes 5, narrowly ovate, reflexed, 2.5-5.0 mm long, glabrous, the upper (inner) surface pale green, the lower (outer) surface darker green tinted with maroon. A short (1 mm) unit of column arises from the calyx and from it the 5 petals arise, the boat-shaped hoods pouched toward the base, narrowly ovate or slightly obovate, 3-4.5 mm long, the tips narrowly or broadly rounded, the margins with a triangular auricle toward base, the backs yellowish or whitish green with a purplish mid-rib zone; from within the petal "pouch" arises a narrow, yellowish or greenish-white, incurved horn about as the hood. Anther head ca. 1 mm long, 1.5 mm broad.

Fruit.--Follicles smooth, erect, narrowly fusiform, 8-10 cm long.

Distribution and Flowering Season

Moist acidic pineland savanna, northeastern and northwestern Florida; flowering from April through July.

Special Identifying Features

Asclepias viridula is superficially much like A. longifolia Michx. in habit, leaf character and flower size; however that species has an anther head longer than the corolla, which itself is somewhat broader and lacks horns.

Habitats and Management Implication

This threatened species is usually found in large or small clearings dominated by grasses and sedges or in large, fire created savannas dotted with slash and long-leaf pine with an understory of saw palmetto interspersed with gallberry and wax myrtle or, in wetter places with shrubby Hypericum or titi-black gum. Its substrate is typically a highly humified, thus blackish, fine sand which remains moist or wet for most of the year. Thus it is a plant of high hydroperiod soil which undergoes gleization.

It, a cormophyte, together with other threatened or endangered species with which it frequently associates (such as Verbesina chapmanii, V. heterophylla, Justicia crassifolia, Euphorbia telephoides, Scutellaria floridana, Cuphaea viscosa, etc. has been maintained historically by naturally caused, periodic, and doubtlessly sometimes intense, fire. This burning reduces shrub competition, together with that of grasses and sedges, opens up the overstory of pine thus admitting the light this plant needs. Most of the collections of this plant show remnants of burned bases, and have been made from burned over savanna. Thus prescribed burning would benefit it, as would cutting or thinning an overstory. Tree planting, preceded by such as dozing, root raking, and chopping would have a negative effect. Bedding, in that it leaves a part of the substrate intact, would allow some plants to survive, but subsequent crown closure of planted pine would later shade it out.

This is a plant that never assumes aspect dominance even within the center of its small range, but which is always of scattered occurrence. Thus it easily qualifies as a "sensitive" species whose maintenance will be a challenge.

References

Small, J. K. 1933. Manual of the southeastern flora, p. 1071.

Woodson, R. E. 1954. The North American species of Asclepias L.,
Ann. Mo. Bot. Gard. XLI (1): 1-211.

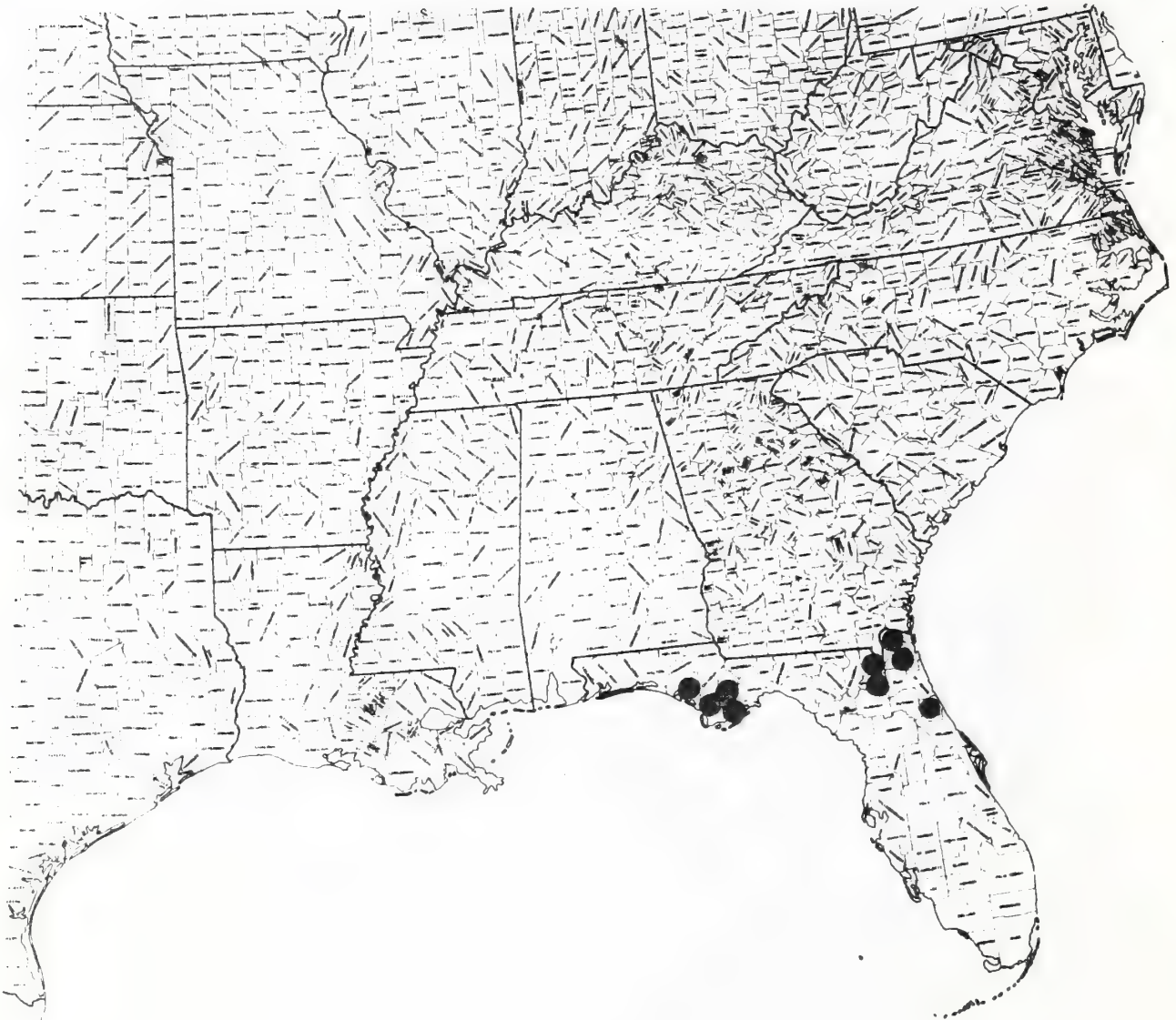
SPECIES: #2 Asclepias viridula Chapm. Milkweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								X
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Asclepias viridula Chapman



ASTERACEAE

Aster spinulosus Chapm. pine-woods aster; Aster
Heleastrum spinulosum Greene

Technical Description

Stiffish perennial herb, mostly 6-8 cm tall, from a short stout caudex cloaked in persistent chaffy-fibrous old leaf bases. Rhizomes, slender, pale, and scaly.

Stems.--Flowering stems 1-few, mostly erect, terete but also ribbed, toward the base greenish and pilose (spreading hairy), upwardly becoming reddish-tinted and smooth.

Leaves.--Linear, numerous and crowded toward the base, there longest, somewhat spreading, up to 2 dm long, smooth save for distantly spinulose margins toward the base, toward the apex entire or somewhat scabrid; leaves gradually diminishing in size upward on the stem, becoming erect, lance-linear with short-spiny tips, and grading into progressively shorter bracts.

Inflorescence.--Heads numerous, arranged in spike-like racemes, each short peduncle subtended by a spreading, lance-linear stiff bract longer than the head. Peduncles rarely as long as 2 mm, supporting 1-2 lance-linear spreading bracts, these grading into the phyllaries. Heads broadly campanulate, about 1 cm from base to pappus tips. Phyllaries (bracts) numerous in several loosely imbricated series, rigid, lanceolate or narrowly triangular, thickish, green with narrow, thinnish maroon, spinulose-serrate or erose borders, the tips narrowed to spiniform short prickles.

Flowers.--Ray florets numerous, the ligules linear-oblong, ca. 1 cm long, nearly white to pale lilac or pale blue, the heads in full bloom about 2 cm. across. Disc florets numerous, the corollas narrowly tubular, yellow, the 5 short-triangular lobes erect.

Fruit.--Akenes linear-columnar, about 2 mm long, pale gray-brown, hairy; pappus 6-7 mm long, of numerous, yellowish-white, rigid, upwardly barbellate, bristles.

Distribution and Flowering Season

Savannas in pinelands, northwestern Florida, primarily in drainages from the Apalachicola River. Flowering from May into July.

Special Identifying Features

This species most closely resembles A. paludosus, a widespread aster of the southeast, but has smaller heads with paler flowers, longer and narrower basal leaves, all leaves sharper pointed and with margins more entire.

Habitats and Management Implications

This plant, said by Small to be in wet pinelands, actually is in more moist than wet situations. Its substrates are acid sandy peats, and it is particularly abundant where fire maintains savanna conditions in what would ordinarily be be longleaf pine-gallberry type. Typically it is found associated with grasses

such as Aristida, Andropogon, Ctenium, sedges such as Rhynchospora globulosus, R. grayii, Xyris caroliniana, Lachnocaulon, Rhexia alifanus, and a variety of other composites indicative of a constantly moist but definitely not wet substrate. It is a plant of full sun or very light shade, thus pines usually only dot its landscape. The shrub understory is usually Ilex glabra, Myrica, Gaylussacia, Lyonia.--Prescribed burning favors such a species by reducing woody competition, as would cutting the pine overstory and understory removal. Most methods of site preparation that involve exposure of the mineral earth through bulldozing, plowing, raking or plowing would eliminate this species, the least damaging method probably being bedding. A successful planting of pine would eliminate this Aster through ultimate crown closure of the young pines. Much of the former area of this species, which includes about four counties, has been lost either through pine plantations, improved pastures, or development of row crop agriculture.

References

Small, J. K. 1933. Manual of the Southeastern Flora, p. 1392.

SPECIES: #3 Aster spinulosus Chapm. Aster

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Aster spinulosus Chapman



ASTERACEAE

Prenanthes roanensis (Chick.) Chick Piedmont rattlesnake-
root; Rattlesnake-Root
Nabalus roanensis Chick.

Technical Description

Perennial herb from a thickened-tuberous, erect caudex (this and all other parts with milky juice), this in winter producing a rosette of long-petioled, triangular-bladed leaves.

Stems.--Erect, to 1 meter all, basally terete, toward apex often fluted or angulate, greenish or maroon, smooth below, toward the apex often with short, crisped hairs.

Leaves.--Rosette and lower leaves usually absent by flowering time, the lowest evident ones long petiolate, alternate, highly variable but blades usually of an ovate or triangular type, the margins irregularly or evenly dentate or denticulate, the apices acuminate, the bases hastate, truncate or broadly rounded, rather abruptly then attenuately narrowing to the petiole, the upper surface dark green, smooth save for short bristles along the midrib, the lower surface paler, short-hairy along the main veins: leaves becoming smaller, with shorter petioles or sessile toward the upper nodes, all the upper ones subtending inflorescence branches.

Inflorescence.--Mostly cylindrical, leafy, of several to many ascending short to somewhat elongate short-hairy branches, these terminating in dense, semicircular cymose clusters of nodding heads. Heads on short-recurved densely crisped-hairy, short-bracted peduncles, narrowly campanulate-cylindric, ca. 1.5 cm long; receptacle naked; phyllaries mostly in 2 series, the outer short, triangular, the inner linear, 5-9, about 1 cm long, blunt-tipped, entire, erect, thin, green sometimes with tints of maroon at tips, the margins thinner, broad, pale, entire, the backs with long, rather stiffish, sordid to nearly black hairs.

Flowers.--All radiate, mostly 5-9/head, the corollas each with a narrow tube ca. 3 mm long and a short-linear, yellowish green blade (ligule) ca. 4-4.5 mm long, this slightly spreading away from the erect (downward-pointing) exserted anthers.

Fruit.--Akenes subcylindric or somewhat angulate, sometimes broadening slightly toward apex, 4-5 mm long, pale brown, smooth. Pappus of numerous yellowish-white, capillary, finely barbellate bristles, in fruit about 7-8 mm long.

Distribution and Flowering Season

Moderate to high elevations in the Blue Ridge and Valley and Ridge provinces of the Appalachians from western Virginia southward through western North Carolina and eastern Tennessee. Kentucky? Flowering from August to frost.

Special Identifying Features.

This species, with its yellowish-green corollas and its hairy phyllary backs is closest to P. aspera but this is a stockier, taller species of prairies to the west and has oblanceolate or spatulate, coarser leaves together with a racemose inflorescence and paler phyllary hairs. It for the same reasons is near P. serpentaria, a plant of lower elevations in the southeast, but that species tends to have more lobate leaves, a broader inflorescence, and more phyllaries/head.

Habitats and Management Implication

P. roanensis usually found on dark, well drained sandy loams either in clearings at or toward summit elevations or in grassy balds. It is not a plant of heavy shade, so when found in forests, it is usually toward the edges. The forest types it is commonest in are fir, spruce-fir, spruce-hemlock-yellow birch, or hemlock-birch-maple. Where there has been fire it may be found around fire-cherry and aspen. There is therefore reason to suspect that fire may increase it by eliminating woody competition and/or shade. Clear cutting would favor its increase, but most known localities for Prenanthes roanensis are not at present being cut.

References

- Milstead, W. L. 1964. A revision of the North American species of Prenanthes. pp. 1-223. Unpublished Ph.D. thesis.
- Radford, A. E., Ahles, H. E. and C. R. Bell. 1968. Manual of the vascular flora of the Carolinas, p. 1020. Chapel Hill, N.C.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1490-1492. Chapel Hill, N.C.

SPECIES: #4 Prenanthes roanensis (Chick.) Chick.; Rattlesnake-Root

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								
No Lasting Effect	X							
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Prenanthes roanensis (Chick.) Chick.



ASTERACEAE

Rudbeckia auriculata (Perdue) Kral. Eared coneflower;
cone flower; blackeyed susan
R. fulgida Ait. var. auriculata Perdue

Technical Description

A large smoothish perennial herb to 3 meters tall from stout rhizomes and increasing by slender rhizomatous offshoots.

Stems.--Arising from very leafy, overwintering rosettes, erect, stiffish, fully 1 cm thick below, terete but usually with many low ribs.

Leaves.--Rosette and lower stem leaves to 6.5 dm long, the blades oblong to oblanceolate or ovate-lanceolate, tips short acuminate to rounded or acute, entire to sinuate, crenate, dentate or coarsely toothed, on long petioles, the surfaces smooth to scabrous or strigose on the veins below and on the petiole. Middle and upper stem leaves sessile, progressively reduced up the stem, elliptic to ovate or fiddleshaped, the bases clasping, auriculate.

Inflorescence.--Heads many in an open broad, paniculate cyme on short to elongate, short-bracteate stalks. Involucre with greenish, stiffish bracts, these oblong-linear, spreading, shorter than the rays, smooth save for scabrous edges. Receptacle elevated, the chaff oblong-cuneate, about 6 mm long, acute, ciliate, the backs with small hairs, the tips deep reddish-brown.

Flowers.--Ray florets with ligules bright yellow, oblong-linear, ca. 2 cm long, spreading-ascending, the backs often short-hairy. Disc 1.0 - 1.7 cm broad, the corollas purple-brown, 3.0-3.5 mm long, the short tube expanding to a narrowly funnelform throat, the lobes short-triangular and erect.

Fruit.--Akenes oblong-curved, 4.0-4.5 mm long, a rich, shining, reddish-brown, 4-ribbed, the pappus unevenly 4-6-toothed, the teeth pale tan, rigid, narrowly triangular, up to 2 mm long.

Distribution and Flowering Season

Bogs, seeps, swamps, ditches and swales, in Alabama mostly Coastal Plain, rarely in contiguous areas of Appalachian Alabama. Flowering from August to early October.

Habitats and Management Implication

R. auriculata is a plant of highly organic, high hydroperiod substrate of varying reaction, ranging from nearly neutral to quite acid (on the basis of associated species). Usually it is in full sunlight, sometimes in the partial shade at edges of hardwood swamps. In bogs and seeps, it will appear in clearings amongst Alnus, Myrica, Cephalanthus, Cyrilla in association with various sedges (particularly Rhynchospora) and wetlands grasses, bog orchids and liliaceae. While its populations are quite scattered and local, such are usually made up of one or more very large clones which may dominate a small area. The plants are fully the height of robust R. laciniata which at a distance they slightly resemble, but in character of head are much more like R. nitida and in total character are unlike any other species of Rudbeckia. A logging of the low hardwood stands it often grows around or in would probably increase its habitat providing this was not accompanied by drainage. The same could be said of

the pine flatwoods areas it is in. Any site preparation involving drainage would eliminate the species. It would not survive under the closed canopy of pine plantation or dense hardwood regeneration.

References

Kral, R. 1975. Rudbeckia auriculata (Perdue) Kral, a species distinct from R. fulgida Ait. Rhodora 77 (809): 44-52.

Perdue, R.W., Jr. 1957. Synopsis of Rudbeckia subgenus Rudbeckia. Rhodora 59: 293-299.

_____. 1961. A new variety of Rudbeckia fulgida. Rhodora 63:119-120.

SPECIES: #5 Rudbeckia auriculata (Perdue) Kral, Cone flower, Blackeyed susar

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect	NA							
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Drainage will also destroy

Rudbeckia auriculata (Perdue) Kral



ASTERACEAE

Rudbeckia heliopsidis T. & G. Sun-facing coneflower;
black-eyed Susan

Technical Description

Perennial herb forming large clones by means of spreading-branching systems of elongate, thickish rhizomes, the branches terminating in overwintering rosettes of strongly petiolate leaves.

Stems.--Arising usually singly from each rosette, mostly between 0.5 and 1 meter tall, erect or decumbent, slender but stiffish, at base perhaps 4 mm thick, terete and dull green, many ribbed and hirsute toward base, upwardly smoother or smooth, sometimes slightly angulate, often with some maroon tints, usually branching only in the inflorescence.

Leaves.--Rosette leaves the largest, from new rhizomal branches produced as the flowering shoots develop from the old, the blades mostly ovate or broadly lanceolate, 6-15 cm long, acute or short-acuminate, distantly or closely serrate, the bases abruptly attenuate, the upper surfaces dark green with a scattering of short appressed hairs (strigillose), the lower surfaces paler, sparsely hirsute along the veins; petioles elongate, slender, longer than or as long as the blades, villous hirsute or hirsute. Lower stem leaves similar to rosette leaves or slightly smaller, often absent by flowering time, scattered sparingly up the stem, becoming progressively shorter petioled, smaller, and more ovate, each from about mid-stem upward subtending an upwardly arching, stiffish inflorescence branch, the lower ones of these either simple or sparingly rebranched.

Inflorescence.--Branches of inflorescence simple or with 1 or 2 stiffish branches, elongate, sparingly bracted with small ovate bracts, each terminating in a long-pedunculate head. Head short-conic, 7-9 mm high, mostly around 10 mm. broad, the phyllaries green, lance-linear, 5-7 mm long, rather loosely imbricated, spreading or reflexed, slenderly acute, or acute, subentire, the outer surfaces tomentose with pale hairs. Receptacle of head conic, the chaff oblong, acute, or broadly rounded, the outer surface of the tips with whitish hairs (some club-shaped) often admixed with sessile white glands, the upper margin ciliate or erose.

Flowers.--Ray flowers sterile, 7-10, the ligules oblong, 1.5-2.0 cm long, spreading, 2-toothed at apex, a clear bright yellow. Disc florets very numerous, the corollas 3.0-3.5 mm long, with a short tube, a slightly expanded tubular throat, and short, triangular, spreading or reflexed lobes, reddish-brown.

Fruit.--Pappus vestigial, the akene apex with very low bluntly triangular teeth at the angles and a rim of short-stalked glands: akene oblong, ca. 3 mm long, usually 4-angled dark brown or nearly black, the ribs and interfaces sometimes with a scattering of pale hairs.

Distribution and Flowering Season

Small seeps, ditches, boggy places, usually over sand or siliceous rock or in wet to moist depressions in outcrops of siliceous rock, mostly Piedmont and Appalachian Plateau of eastern Alabama and western Georgia with outliers in the inner Coastal Plain of Harnett Co. North Carolina and in the Blue Ridge of South Carolina (Oconee County) Flowering from late July into late September.

Special Identifying Features

Sections in Rudbeckia are distinguished on the basis of fine characters involving chaff (pales) and character of stigma tips. This species has blunt, hairy chaff tips and stigma tips that are short and obtuse, which distinguish it from most of the common Rudbeckias. Its closest relatives have either larger heads or sessile lower stem leaves or both. The only species with which it would be associated in the wetlands it frequents is R. fulgida, a highly variable but smoother species with more deeply yellow (orange yellow) rays and a totally different chaff and pappus character.

Habitats and Management Implication

The forest type in which R. heliopsidis is found in is mostly either upland oak-hickory or oak-pine-hickory or open pine-mixed hardwoods (as in the Little River Canyon of northeastern Alabama). It is a plant of seeps, bogs, sandy wet clearings along rivers, always on wet sandy-organic substrates. Most of it is in out-crop areas or very bouldery situations, poorly suited to most agriculture. The seeps it frequents are usually quite acid, mostly populated by grasses, sedges and herbs of bogs (including the rare Sarracenia oreophila in northern Alabama). Logging of the mostly low-quality forest around it, so long as drainage was not involved, would probably effect this species very little unless it would be to increase its area as it freely seeds into wet sandy places. Thus far, its main enemies appear to be drainage of some upland swales for farming or pasture, or simply grazing. It does not hold up well under grazing.

References

- Radford, A. E., Ahles, H. E., and C. R. Bell. 1968. Manual of the vascular flora of the Carolinas, pp. 1108. Chapel Hill, N.C.
- Small, J. K. 1933. Manual of the southeastern Flora, pp. 1422-1424. Chapel Hill, N.C.

SPECIES: #6 Rudbeckia heliopsidis T. & G. Black-eyed susan

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Craze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	?				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Rudbeckia heliopsidis T. & G.



ASTERACEAE

Silphium confertifolium Small. Southern rosinweed;
rosinweed

Technical Description

Coarse smoothish perennial from a stout erect caudex or with knotty, ascending rhizome, the roots thick.

Stems.--Usually solitary from overwintering rosettes, to 7 dm tall, but usually lower, erect, unbranched save in inflorescence, terete but fluted, greenish with tints of red or maroon.

Leaves.--Stem leaves concentrated toward the base and there largest, blades broadly lanceolate or ovate, variable in length, from 7-20 cm long, acute, entire, ciliate-scabrid, the bases from broadly rounded to broadly cuneate, thence abruptly attenuated down the petiole which is no more than 1/3 the blade length: upper leaf surface smooth or with distant short sharp hairs, dark green; lower surface paler, veiny, sometimes with a scattering of hairs along the prominent midrib; leaves above the stem base sharply reduced in size and on more elongate internodes, erect, opposite sessile or short-petiolate, more often elliptic or lanceolate, grading into distant pairs of small ovate bracts.

Inflorescence.--Of few to many heads in a more or less open or congested cyme on peduncles much longer than themselves, the inflorescence branches stiffly ascending from the upper stem nodes. Heads broadly campanulate, across the bracts ca. 1 cm high and to 1.5 cm broad, the several firm bracts overlapping loosely spirally, mostly ovate, the greenish tips often spreading apically, acute to obtuse, the margins stiffly ciliate; involucral bracts grading gradually to narrower (mostly oblong) pales (chaff) whose tips are purplish, with a strigillose whitish pubescence.

Flowers.--Ray florets 8-10, fertile, the ligules spreading, oblong-linear, ca. 1.5 cm long, lemon yellow; disc florets on a slightly elevated receptacle, mostly sterile, the corollas tubular with ascending, broadly triangular lobes, greenish-yellow.

Fruit.--Akene broadly obovate, flattened, ca. 6-7 mm long laterally winged with wings 1 mm. or less broad, these terminating in 2 low-triangular teeth at sides of akene summit; akene body appressed white-hairy on its inner concave face, otherwise smooth, gray-brown when ripe.

Distribution and Flowering Season

Prairies and glades over chalk, Black Belt Alabama; flowering July into early September.

Special Identifying Features

This species is closest taxonomically to extremes of Silphium trifoliatum L. var. latifolium Gray, and both may occur in the same area, the latter distinguished by its lower habit, smaller leaves, and especially by its tendency to have the leaves more crowded toward the base with the mid and upper stem leaves abruptly reduced in size. It should probably be treated as an extreme or at best as a subspecies of S. trifoliatum, yet for the reasons stated above is quite distinctive in the

field. So far it has been found only in Choctaw, St. Clair, and Sumpter counties in Alabama.

Habitats and Management Implication

S. confertifolium appears to be calciphilic, being thus far found only on the heavy black clay earths that weather from calcareous rock. These soils, with their very fine texture, tend to be very wet and sticky during the rainy periods, bake to brick-like character during dry periods. This silphium is usually in association with prairie plants including a large array of grasses, sedges, composites, umbellifers in areas that once were probably fire maintained and thus could be termed savanna-prairie. Oak species such as Q. shumardii, Q. phellos, Q. nigra, Q. durandi, Q. stellata, hickory such as Carya ovata, C. carolinae-septentrionalis, C. myristicaeformis, elm, osage-orange, hercules club, green and white ash, and juniper typify the forest. The region this plant grows in is dotted with outcrops of limestone, particularly chalk, these unsuited for any row crops and S. confertifolium will grow in shallow soils that accumulate in and around such outcrops. It may have ranged into the deeper soils further from outcrops but such have largely been converted to row crops or to improved pasture grasses, these last tending to close out the original growth of forbs and grasses. S. confertifolium and other such plants thus are on the border of extinction. Outcrops where these may yet be found are mostly heavily grazed, and their poor quality pasture is mostly eaten to the ground by poor quality cattle or goats. In areas where both cattle and fire are excluded, trees are coming back in, particularly Juniper, and such forbs are being closed out.

References

Perry, Lily M. 1937. Notes on Silphium, Contribs Gray Herb. CXVII: pp. 281-296.

Small, J. K. 1933. Manual of the southeastern Flora, pp. 1408-1415. Chapel Hill, N.C.

SPECIES: #7 Silphium confertifolium Small, Rosinweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	but NA				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Silphium confertifolium Small



ASTERACEAE

Vernonia pulchella Small; Georgia ironweed; ironweed

Technical Description

Perennial herb, rather coarse, but usually 1 meter tall or less.

Stems.--One to several from a short, stout, thick-rooted caudex, slender but stiffish, not branching below the inflorescence, round in cross section, also fluted with several ribs, variable in pubescence from nearly smooth to villous, appressed-puberulent or scatteringly hirsute or with a mixture of these hairs, strongly maroon or purple-tinted.

Leaves.--Stiffly erect or spreading, numerous, alternate, lanceolate to oblong, elliptic or obovate, the lowest smallest and distant, the largest at or just below mid-stem, mostly 3-6 cm long, the tips acute or obtuse angled, the margins revolute, entire or coarsely serrate, the base sessile or on a short stout petiole, auriculate, the upper surface dark green, the lower paler, both surfaces scabrous.

Inflorescence.--Several to numerous-headed, an open broad cyme of cymes, the main branches ascending from the axils of reduced stem leaves and stiffish, the peduncles erect or spreading, usually fine-hairy and longer than the heads or sessile. Heads campanulate, from base to tip of phyllaries ca. 1 cm and nearly as broad, the phyllaries (bracts) numerous, imbricate in several spirals, narrowly triangular to narrowly ovate, the outer ones smallest, loosest, and narrowest, the longer ones ca. 7 mm long, the tips slender acuminate, recurved, giving a "bristly" look to the heads, the surfaces green with maroon or purple tints, cobwebby ciliate-hairy marginally and sometimes on the backs.

Flowers.--All discoid, all fertile, 20-36 on an elevated, naked receptacle, the purple corollas projecting ca. 5 mm beyond the bracts, about 1 cm long with a long tube, narrowly funnelform throat and 5 narrowly triangular, spreading lobes.

Fruit.--Ripe akenes about 3 mm long, oblong, strongly many-ribbed and bristly along the ribs, yellowish-green with flecks of purple, the pappus of many capillary stiff barbellate bristles ca. 8 mm long, these sordid or dull-brown.

Distribution and Flowering Season

Pine-saw palmetto flatwoods, southeastern Georgia, late July to early September.

Habitat and Management Implication

This distinctive ironweed is not rare within its rather small range, though it is nowhere aspect dominant. Its soils range from rather dry to quite moist, but are usually those of low rises in flatwoods or of edges of seep areas in longleaf pine forested ridges. It is a plant either of full sun, or is found in savannas or in the intermittent shade of tall and scattered pines. It is best developed in areas that have been burned recently, where it may be locally abundant together with a myriad of other summer flowering composites, grasses and sedges, etc. It will

appear in clearings amongst palmetto, gallberry, wax-myrtle, and various ericaceous shrubs particularly Lyonia, Vaccinium, Gaylussacia. As is true of cormophytes it holds up well even under hot fires, putting up new shoots rapidly and producing heavy crops of flowers and fruit in the burns. It will persist in drained areas but is shaded out in young plantations. It will occupy areas that have been subjected to nearly all methods of site preparation, so long as a contiguous seed source is available, but the shade of well stocked pine plantations eliminates it and most other savanna forbs. As is true of many ironweeds the species can survive moderate grazing activity.

References

Gleason, H. A. 1906. Vernonieae, North American Flora 33: 52-95.

Jones, S. B. 1964. Taxonomy of the narrow-leaved Vernonia of the Southeastern United States, Rhodora 66 (768): 382-401.

SPECIES: #8 Vernonia pulchella Small Ironweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								
No Lasting Effect								X
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Vernonia pulchella Small



ASTERA*EAE

Viguiera porteri (A. Gray) Blake. Porter's golden-eye;
Confederate daisy
Gymnolomia porteri A. Gray

Technical Description

A taprooted annual.

Stems.--The main stem erect, to 8 dm tall but usually lower, simple or many and oppositely branched from below the middle, thus bushy and spreading, the main shoot slender but stiffish and brittle, terete below, somewhat ribbed toward the tip, yellow-green or tan, or tinted with maroon, somewhat harsh.

Leaves.--Numerous, alternate, the lowest gone by flowering time, those of mid-stem or mid-branch longest, spreading-ascending linear, or lance-linear, mostly 3-4 (-6) cm long, acute, revolute, sessile or nearly so, 1-veined, the upper surface harsh, dark green, the lower surface paler, harsh or even hirsute along the mid-rib: stem leaves grading gradually into narrower and shorter bracts of peduncles.

Inflorescence.--Peduncles slender, arching upward from upper bracteal leaves, themselves much longer than the heads and with few or no bracts. Heads ovoid-conic, 1.0-1.4 cm, high, the involucre hemisphaeric, 4-5 mm high, 7-10 mm broad across phyllary tips. Involucral bracts with outer series narrowly triangular, spreading, green, smooth or with a scattering of pale hairs on backs and edges and with inner series firmer, yellowish-tan, strongly many nerved, ascending, lance-ovate, acuminate, grading on the conic receptacle to narrower, thinnish, narrowly acute-tipped chaff, this greenish-brown with paler nerves.

Flowers.--Ray florets mostly 8-10, sterile, the corollas 1.0-1.5 cm long, oblong or elliptic-oblong, bright yellow, spreading. Disc flowers numerous, fertile, the corolla ca. 2.5 mm long, yellow with a short narrow tube flaring into a campanulate throat, the narrowly triangular lobes recurved.

Fruit.--Akene slightly flattened, about 2.5 mm long, in outline oblong or obovate, the apex broadly rounded or truncated, without a pappus, the surface dark gray-brown with darker blotches, toward the apex with several short, erect, pale hairs.

Distribution and Flowering Season

On and around granite outcrops in the Piedmont from Alexander County, North Carolina southwestward to Randolph and Chambers Counties, Alabama in Saint Clair and Shelby counties of Appalachian Alabama.

Special Identifying Features

This species, called "Confederate Daisy" is a northeastern representative of a largish genus of the southwestern U.S.A., Mexico and southward, thus has no near taxonomic relatives in the southeast.

Habitats and Management Implication

It was first known from the large granite outcrops, particularly Stone and Panola Mountains, of Georgia. In that the outcrops are local, so is the species, but

where it does occur it is an aspect dominant in fall, turning acres of granite to yellow gold. In that some of the outcrops are being converted to parks and nature conservacies, and in that it is weedy in such places, its future is bright. A plant of full sunlight and shallow soils it is forest related in the sense only that pines and low quality hardwoods ultimately occupy outcrops. Cutting of contiguous pines and erosion would probably increase this species whose major man-caused threat is the quarrying away of its granitic substrate.

References

Blake, S. E. 1918. A revision of the genus Viguiera. Contribs. Gray Herb. Harvard 54: 1-205.

McVaugh, R. 1943. Vegetation of the Granite Flatrocks of the Southeastern U. S. Ecol. Monograph 13: 120-166.

Small, J. K. 1933. Manual of the southeastern flora, pp. 1421-1422. Chapel Hill, N.C.

SPECIES: #9 Viguiera porteri (A. Gray) ~~Blake~~. Confederate daisy

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								X
No Lasting Effect	NA							
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Viguiera porteri (A. Gray) Blake



Leavenworthia alabamica Rollins var. alabamica; Glade cress

Technical Description

Leaves.--Larger rosette leaves rarely longer than 1 dm. long, oblanceolate, the terminal segment sometimes round but more often reniform (broader than long), usually coarsely dentate or crenate; lateral segments usually several pairs, mostly asymmetrical, from broadly to narrowly triangular (often with tips pointing upward or downward) or obovate, entire or variously toothed or lobed, and with leaflet pairs progressively reduced in size and more distant on the rachis downward.

Flowers.--Sepals mostly oblong, 5-7 mm. long, spreading at flowering time, pale green with tints of maroon. Petals obovate-bladed, 1.0-1.4 cm. long, spreading at anthesis, the blade white to pale lavender, deeply emarginate, the base (including the short claw) yellow or orange yellow.

Fruit.--Silique narrowly oblong, not fleshy, acute above and below, strongly flattened, 1.5-2.5 cm. long, 3.0-4.5 mm. wide; style 2.5-5.5 mm. long. Seeds dark brown, orbicular, winged, 3-4 mm. in diameter.

Distribution and Flowering Season

Open limestone glades and heavy soils of open fields derived from limestone, northwestern Alabama from central Colbert and Franklin counties eastward to middle Lawrence county. Flowering from late February through April.

Special Identifying Features

In flower this species resembles L. torulosa, L. exigua or white or lavender flowered forms of L. stylosa. It differs from the first by not having a torulose ovary and fruit; it differs from the second by its longer (10-16 mm. versus 7-10 mm.) petals which are more deeply emarginate; it differs from the third in its shorter (6-12 mm. vs. 12-25 mm.) flatter, less fleshy siliques. This is perhaps the showiest and most abundant of the genus in Alabama.

Leavenworthia alabamica Rollins



Leavenworthia exigua Rollins var. exigua; Glade cress

Technical Description

Leaves.--Early leaves with a remote, shallowly toothed terminal lobe, fully developed leaves lyrate-pinnatifid (see genus description), 1.5-6 cm. long, the lobes with varied margins.

Flowers.--Sepals linear-oblong, 3.5-5.5 mm. long, greenish or with lavender tints, erect or spreading in full flower. Petals spatulate to tongue-shaped, shallowly emarginate, 6-9 mm. long, 3.0-4.5 mm. wide, blade white to light lavender, the "eye" spot yellowish or petals yellow in the variety lutea.

Fruit.--Siliques very flattened, non-fleshy, oblong, 1-2 cm. long, 3.5-5.5 mm. wide, obtuse above and below, the style 1-3 mm. long. Seeds 4-10/silique, winged, nearly flat, unevenly round, 3-4 mm. broad.

Distribution and Flowering Season

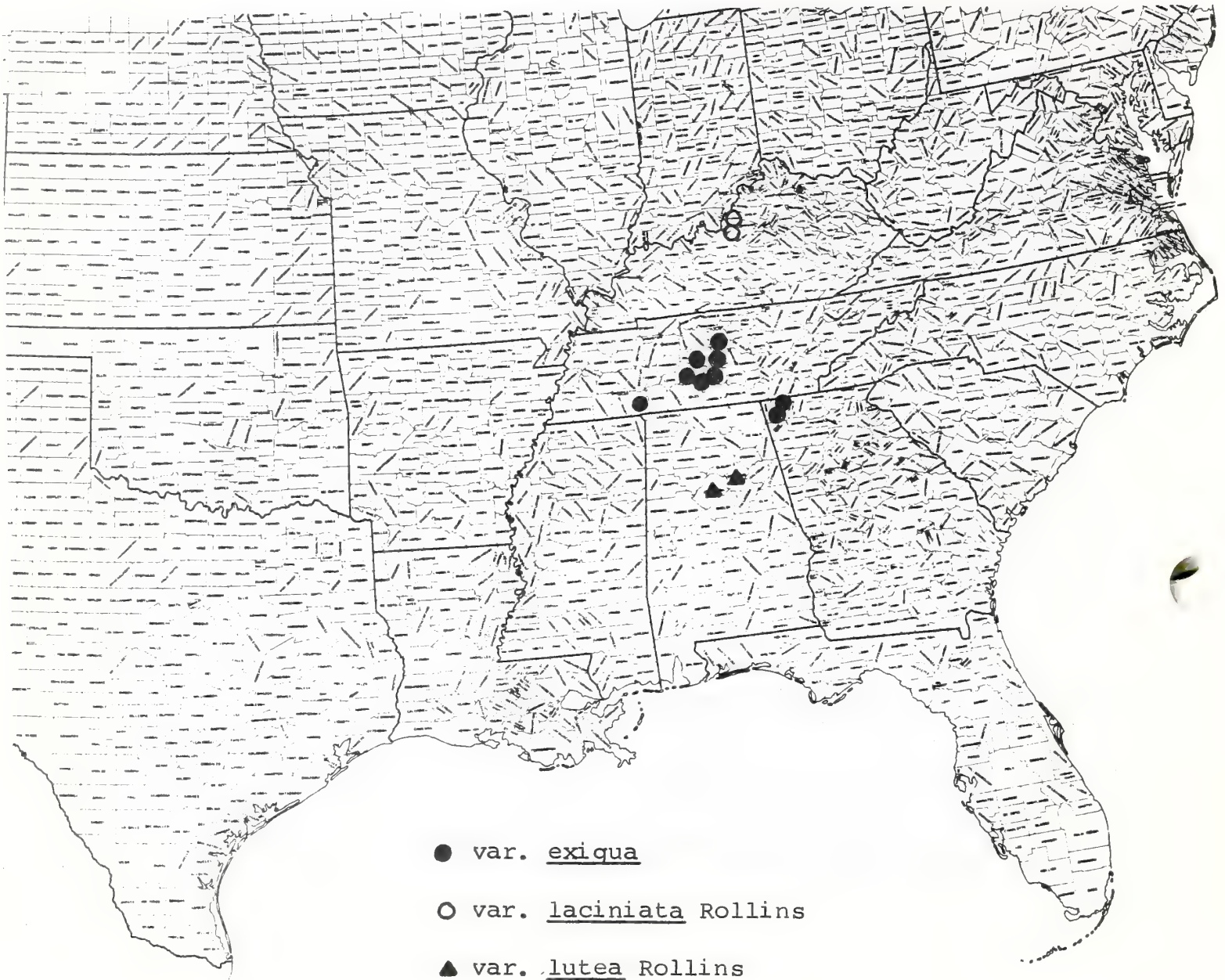
Local in limestone glades in the Central Basin of Tennessee and in northwest Georgia.

Special Identifying Features

This species differs from other emarginate-petalled Leavenworthia as follows:

1. Petal blades shallowly emarginate, petals 7-10 mm. long, styles 1-3 mm. long. This eliminates L. stylosa, L. crassa, L. alabamica which have longer and more deeply emarginate petals, longer styles.
2. Siliques thin, without margins. This eliminates the species L. aurea which occurs only in Oklahoma and eastern Texas.
3. Fruit not torulose. This excludes L. torulosa, whose fruit is constricted between the roundish seeds.

Leavenworthia exigua Rollins



Leavenworthia stylosa Gray; Glade Cress

Technical Description

Leaves.--Fully grown leaves lyrate pinnatifid, the terminal lobe largest, usually broader than long, the lateral lobes varied in number and margin.

Flowers.--Sepals linear-oblong, spreading at flowering time, 4-8 mm. long, greenish or with tints of maroon. Petals obovate to broadly spatulate, 9-15 mm. long, deeply emarginate, the blades white, yellow (mostly) or lavender, the claws deep yellow or orange, the blades spreading broadly at full flower.

Fruit.--Siliques oblong to linear, 1-3 cm. long, 2.5-4.5 mm. broad, 2-4 mm. thick, the body obtuse above and below, fleshy, on an evident stalk (gynophore) to 1 mm. long; style 3-8 mm. long. Seeds dark brown, winged, broadly oblong to suborbicular, 3.0-4.5 mm. long.

Distribution and Flowering Season

Locally abundant in the Central Basin of Tennessee in limestone glades and calcareous fields. Commonest in Davidson, Rutherford and Wilson Counties, areas of Tennessee in which limestone glades are best developed.

Special Identifying Features

Distinguished by its large (comparatively) deeply emarginate mostly yellowish petals, by its comparatively elongate siliques which while somewhat compressed are also fleshy, and its elongate styles.

Habitats and Management Implication

In some glades an early spring aspect dominant, covering acres with a carpet of golden-yellow, very fragrant blooms. Some of the greatest concentrations of this species have been lost through the damming up of the Stones River, subsequent development of lakeshore estates, and through expansion of the cities of Nashville, Murphreesboro, and Smyrna.

Leavenworthia stylosa Gray



Leavenworthia torulosa Gray, Glade cress

Technical Description

Leaves.--Early leaves with a long petiole and a broad, cordate blade; later fully grown leaves lyrate pinnatifid (as in the other species).

Flowers.--Sepals narrowly oblong, 3.5-5.5 mm. long, greenish or with tints of lavender or maroon, spreading or erect at flowering time. Petals spatulate, 6-10 mm. long, emarginate, white or light lavender bladed usually, rarely yellow or deep lavender.

Fruit.--Siliques linear, torulose (constricted between seeds so as to resemble a string of beads), 1.5-3.0 cm. long, 2.5-4.0 mm. wide, 2.0-3.5 mm. thick, styles 2.5-5.0 mm. long; gynophore (stalk below ovary and fruit) about 1 mm. long. Seed nearly wingless, longer than broad.

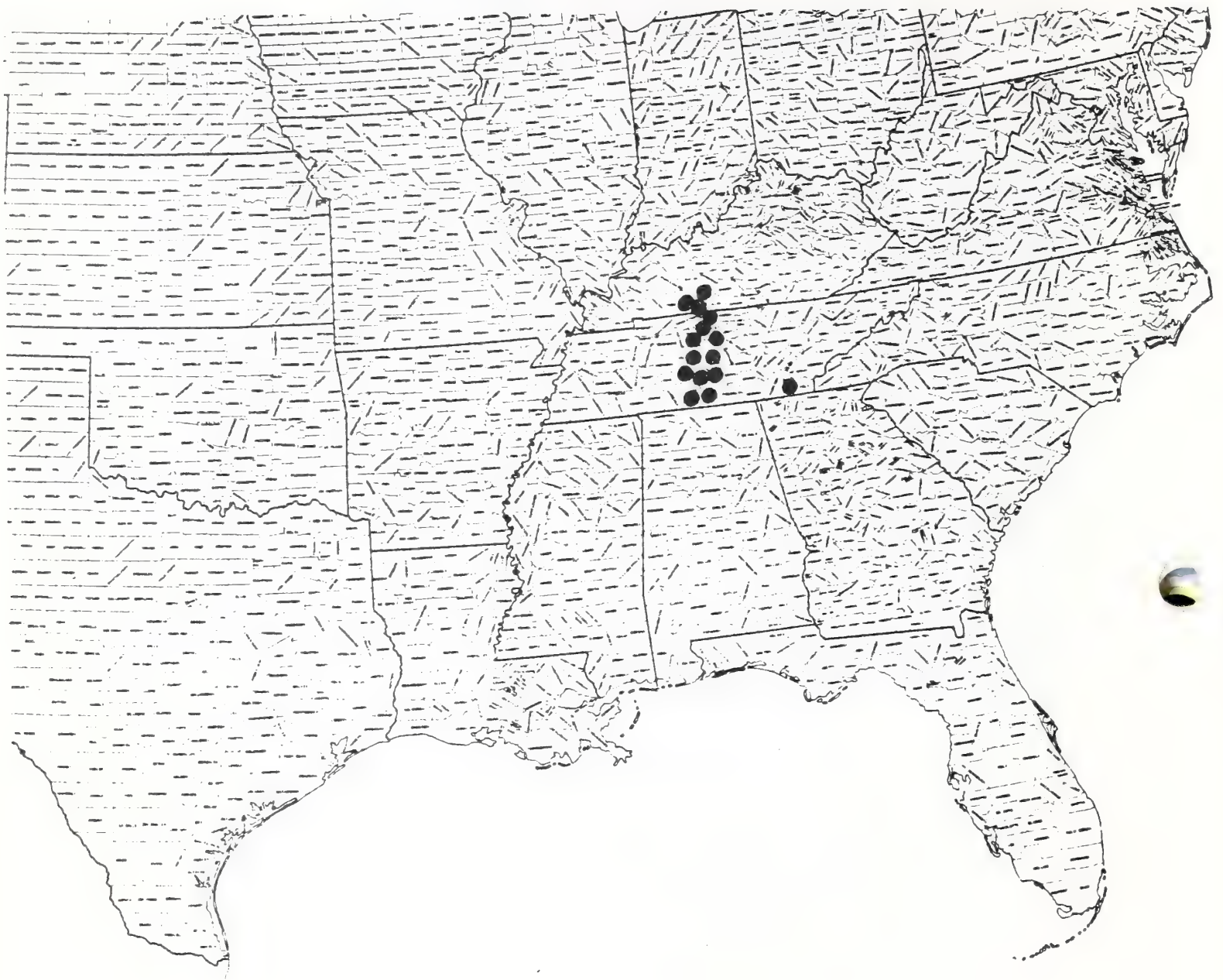
Distribution and Flowering Season

Locally abundant in limestone glades and calcareous soil of low fields and ditches, southern Kentucky through middle Tennessee, with one outlier in Bradley county in Southeastern Tennessee.

Special Identifying Features

This species is distinguished from all others by its torulose ovary and fruit. It is found in but one locality in Kentucky, but is often the most abundant species in many of the glades of middle Tennessee.

Leavenworthia torulosa Gray



CARYOPHYLLACEAE

- Arenaria fontinalis (Short and Peters) Shinnery; pioneer
sandwort; Sandwort
Sagina fontinalis Short and Peter
Stellaria fontinalis (Short and Peter) B. L. Robins
Alsine fontinalis (Short and Peter) Britton

Technical Description

Slender but stiffish smooth annuals with shallow, diffuse flimsy roots.

Stems.--Up to 1.5 dm long, mostly much shorter, several erect or spreading from the base, terete or with narrow wings decurrent from leaf bases.

Leave .-- Opposite from overwintering tufts, the cauline narrowly oblanceolate or linear, spreading, mostly 1.0-1.5 cm long, acute, entire with thinnish margins, attenuate to slightly clasping bases, pale yellowish-green.

Inflorescence.--Basically but asymmetrically cymose, the stems branching from near the base, each branch bearing at its axil a long-stalked symmetrical flower. Flower stalks 5-10 mm long in flower, elongating to 2 cm or more in fruit, smooth, slender, somewhat ribbed or angulate.

Flowers.--Sepals 4-5, erect in bloom, narrowly ovate-triangular, thin, about 2.5 mm long, pale yellow-green with very broad thin entire margins, apically mucronate and acute, 3-nerved. Petals absent or vestigial. Stamens as many as 10 but usually around 4-5, shorter than the sepals. Ovary superior, the styles 3-4 the placentation free-central with several ovules.

Fruit.--Capsule 3.0-35 mm long ovoid, its tip projecting above the perianth, at maturity splitting into 3 valves. Seeds nearly round or round and unevenly compressed in places, nearly 1 mm. broad, covered with tiny papillae, a dark lustrous reddish-brown.

Distribution and Flowering Season

Seeps over limestone or in calcareous soil, known only from the Interior Low Plateau near Lexington, Kentucky and middle Tennessee. Flowering in April and May.

Habitats and Management Implication

This rare species is known only from permanently wet areas, usually seeps and seepage areas around limestone outcrops or bluffs. It is in clearings in or in light shade of calciphilic hardwood species such as Maclura pomifera, Quercus muhlenbergii, Q. shumardii, Ulmus serotina, U. rubra, Acer saccharum, Carya caroliniae-septentrionalis, gymnosperms such as Juniperus virginiana. Common shrubs of such areas are Rhus aromatica, Rhus glabra, Rhamnus caroliniana, Symphoricarpos.

In the seeps this plant may dominate small wet areas with mats of growth, these mats interspersed with other herbs such as Cyperus, Eleocharis (particularly E. compressa, E. obtusa), Agrostis stolonifera, Gratiola neglecta. By late May the Arenaria begins to die back and by early June the plants are not in evidence.

Best growth of the species is in full sun or light shade. Logging of contiguous hardwoods where local seeps occur would probably favor increase; however, the topography is such and the site quality of such areas is such, that good merchantable species are few. The main enemy this plant has is drainage in that permanently wet substrates are required for its maintenance.

References

Gleason, H. A. 1958. Illustrated Flora, Vol. II, pp. 123-126.

Small, J. K. 1933. Manual of the southeastern flora, pp. 497-498.

Shinners, L. H. 1962. New names in Arenaria (Caryophyllaceae).
Sida 1 (1): 49-52.

SPECIES: #19 Arenaria fontinalis (Short and Peters) Shinnery. Sandwort

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy								
Damage							X	X
No Lasting Effect	NA							
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Arenaria fontinalis (Short & Peter) Shinnery



CISTACEAE

Lechea cernua Small. Nodding pinweed; Pinweed

Technical Description

Shrublike perennial herb, usually from a deep taproot and with several spreading, ascending or erect shoots from a branching caudex.

Stems.--New shoot growth usually spreading, forming overwintering "rosettes", the shoot surfaces and the broad (around 0.5 cm long) ovate or elliptic new shoot leaves tomentose with white hairs. Flowering shoots up to 5 dm tall, woody, much branched at least above the middle, the secondary branches again rebranching, the crown of a shoot therefore with a ovoid or pyramidal aspect, the shoot surfaces reddish, but cloaked with appressed grayish or whitish hairs.

Leaves.--All but the uppermost shoot leaves of fertile shoots absent by flowering time (these thus usually confined to the numerous branchlets), narrowly ovate or elliptic, sessile or short stalked, 1 cm long or less, very firm, acute, sometimes mucronate or apiculate, entire, the bases cuneate, the surfaces slightly to copiously appressed hairy.

Inflorescence.--Flowers solitary or in small fascicles in the axils of upper leaves of branchlets, on appressed-hairy stalks 1.5-2.5 mm long.

Flowers.--Calyx ca. 2 mm long, sepals 5 fused to form a pyriform outline, the inner 3 lobes broadly obovate, the backs appressed-hairy, much longer than the short-linear outer 2. Petals short, reddish, lost just after anthesis. Stamens 5-15.

Fruit.--Capsule ellipsoidal or ovoid, dull, about 2 mm long, slightly surpassed by or equalling the inner sepal tips, the valves blunt, firm. Seeds 1 or 2, equilateral to irregular, slightly more than 1 mm long, dark brown, the dorsal surface convex.

Distribution and Flowering Season

Sandy rises, sandhills and sandhills scrub, mostly in the sand-pine type, southern peninsular Florida. Flowering July, August.

Special Identifying Features

This species is part of the complex in which the outer sepals are shorter than the inner sepals, and in which the ripe capsule is exceeded by or slightly exceeds the calyx. Within that complex it is the only species in which both stem leaf surfaces are hairy and in which the basal leaves are very densely so on both surfaces.

Habitats and Management Implication

L. cernua is always found in deep sands, usually ancient dunes, on which the most common forest is a mixture of evergreen scrub oaks such as Q. maritima, Q. myrtifolia, Q. chapmanii, hickories such as Carya floridana, other scrub species such as Ceratiola, Osmanthus, Lyonia, palmetto. The dominant pine is P. clausa,

with P. elliottii and P. palustris occasional. The lechea may be found under mature scattered pine or oak, but is more frequently in sandy openings along with species of Andropogon, Aristida, dryland species of Rhynchospora such as R. megalocarpa, Cyperus. Fire has probably helped to maintain the clearings it naturally frequents. Drastic soil disturbance such as logging probably increases it. Site preparations involving exposures of the sandy substrate, so long as there are contiguous areas to provide a seed source, increase this species.

References

- Hodgdon, A. R. 1938. A taxonomic study of Lechea. Contribs. Gray Herb. CXXI: 29-131, plates 488-491.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 881-884. Chapel Hill, N.C.
- Wilbur, R. L. and H. S. Daoud. 1961. The genus Lechea (Cistaceae) in the southeastern United States. Rhodora 63 (748): 103-118.

SPECIES: #20 Lechea cernua Small, Pinweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage								
No Lasting Effect	NA		NA					
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Lechea cernua Small



CISTACEAE

Lechea divaricata Shuttlw. Pine pinweed; pinweed

Technical Description

Somewhat shrubby perennial herb to 5 dm.

Stems.--All shoots developing flowers (no resting shoots produced), with several spreading from a taproot with a branched lower stem, the young shoots numerous, very hairy at first, as they develop arching outward, then upward, or sprawling, branchlets numerous, spreading, all shoots and branches spreading-hairy.

Leaves.--Spirally arranged, the basal ones scattered, the ones on the secondary shoots and branchlets rather close-set, spreading, lanceolate to elliptic or oblong, 3-8 mm long, sharply acute, entire, firm, nearly sessile, the lower surfaces pilose with long white hairs, the upper surface smooth.

Inflorescence.--Flowers produced along all or most the length of the mostly short ultimate branches, rather numerous, the whole inflorescence of a branch rather narrow, often cylindric, on the lower branches usually from axils of bract leaves, on the upper branches as bractless, compact racemes. Flower stalks 1.0-1.5 mm long, strongly appressed-hairy.

Flowers.--Calyx lobes 5, the calyx ca. 2 mm long, the fused portion campanulate, the lobes slightly spreading or erect, the inner three broadly ovate, rather cup-shaped, hairy-backed, the outer 2 much shorter, linear. Petals reduced, Stamens numerous, 15-25.

Fruit.--Capsule elliptic-ovoid, about 2 mm long, its tip projecting conspicuously beyond the sepal tips, lustrous. Seeds 1-4 but only 1 usually maturing, about 1 mm long asymmetrically oblong, round angled and with large irregular concavities.

Distribution and Flowering Season

Mostly in sand pine sandscrub, central and southern peninsular Florida, July-October.

Special Identifying Features

This species is like the widespread L. villosa in the spreading hairs of its stems and lower parts of branches, but differs in its slender, more spreading, habit, in its more exerted capsule which does not split at maturity. Also its leaves are smaller, shorter.

It is one of 2 species whose exterior sepals are shorter than the interior ones, and whose capsules are much longer than the calyx. Here it differs from L. deckertii in its spreading (versus more appressed) stem pubescence, its thicker walled capsules, its broader leaf outlines.

Habitat and Management Implication

The habitat of L. divaricata is similar to that of L. cernua and the management implications are the same.

L. divaricata is always found in deep sands, usually ancient dunes or ecotonal to moister duneswales, on which the most common forest is a mixture of evergreen scrub oaks such as Q. maritima, Q. myrtifolia, Q. Chapmanii, hickories such as Carya floridana, other scrub species such as Ceratiola, Osmanthus, Lyonia, palmetto. The lechea may be found under mature scattered pine or oak, but is more frequently in sandy openings along with species of Andropogon, Aristida, dryland species of Rhynchospora such as R. megalocarpa, Cyperus. Fire has probably helped to maintain the clearings it naturally frequents. Drastic soil disturbance such as logging probably increases it. Site preparations involving exposures of the sandy substrate, so long as there are contiguous areas to provide a seed source, increase this species.

References

- Hodgdon, A. R. 1938. A taxonomic study of Lechea. Contribs. Gray Herb. CXXI: 29-131, plates 488-491
- Small, J. K. 1933. Manual of the southeastern flora, pp. 881-884. Chapel Hill, N.C.
- Wilbur, R. L. and H.S. Daoud. 1961. The genus Lechea (Cistaceae) in the southeastern United States. Rhodora 63 (748): 103-118.

SPECIES: #21 Lechea divaricata Shuttlw. pinweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage								
No Lasting Effect	NA		NA					
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Lechea divaricata Shuttlw.



CONVOLVULACEAE

Bonamia grandiflora (A. Gray) Heller; large-flowered
bonamia; N.C.N.

Breweria grandiflora A. Gray

Technical Description

A sprawling perennial herb.

Stems.--Several weak stems to 3 meters long extending outward flat over the sand from a central semiwoody deep rootstock, round in cross-section, short and appressed-hairy with fine, silky hairs.

Leaves.--Numerous, the blades erect or spreading firm, ovate, broadly oblong or obovate, the largest 4-5 cm long, rounded or emarginate, usually short-mucronate, the margins entire, the base usually broadly rounded or cordate, the surfaces appressed-silky-short-hairy, the petioles short, about 3 mm long, densely short-hairy. Smallest stem leaves toward stem base, the largest at about mid-stem, these grading gradually into bracteal leaves which are along the distal 1/2-1/3 of the shoot.

Inflorescence.--Flowers solitary in the bract axils, erect on stiffish, appressed--hairy stalks mostly 1.0-2.5 cm long, these midway with a pair of erect, lanceolate, puberulent bracts around 5 mm long.

Flowers.--Sepals 5, unequal, in 2 series, oblong, narrowly ovate or lanceolate, stiffish, erect, the apex acuminate, the margins entire, the backs pale green and covered with appressed silky hairs, the whole calyx up to 2.0-2.5 cm long. Corolla opening in early morning, closing by early afternoon, funnelform, 7-10 cm long, fully 7-8 cm across the limb, a pale but vivid blue with a paler centre. Stamens 5, alternating with petal midribs, up to 5 cm long, the slender filaments with bases glandular-hairy, the anthers narrowly oblong, yellowish, about 5 mm long. Ovary superior, the style about 4 cm long, branched into 2 slender branches about midway up, each branch terminating in a small, buttonlike stigma.

Fruit.--Capsule broadly ovoid, 1.3-1.5 cm long, with 4 valves, the walls firm but thin. Seeds smoothish, pale brown or greenish brown, 5-8 mm long, oblong, the outer face convex, the inner 2 flat, forming an angle.

Distribution and Flowering Season

Sandy clearings in sandscrub, peninsular Florida. Flowering May to August.

Special Identifying Features

This species is unlike any other southeastern convolvulaceous plant. A sprawler, not a vine, it has flowers fully as large and spectacular and with the same color as the Heavenly Blue Morningglory.

Habitats and Management Implications

B. grandiflora is strictly a sandhills plant, being locally abundant on deep white sands of ancient dunes and sandridges in clearings amongst scrub oaks

(mainly Q. myrtifolia, Q. chapmanii, Q. maritima), Ceratiola, Lyonia, Ilex ambigua, Garberia, palmetto, etc. The overstory, when present, is usually Sand Pine.

Because this a plant of full sun and of dry sandy sites its history is probably one of fire increasing its area through reducing woody competition. Clearcutting of the pine would increase its area, as would mechanical removal of areas of scrub. However, a complete overturning of the sandy substrate such as would be involved in most site preparation on such soils, would temporarily eliminate this species. These artificial clearings would ultimately be occupied by such species as this, providing there were contiguous seed sources but a dense plantation or a natural stand of pine would create too much shade for its maintenance.

Reference

Small, J. K. 1933. Manual of the southeastern flora, pp. 1080.

SPECIES: #22 Bonamia grandiflora (A. Gray) Heller, N.C.N.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			NA					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Bonamia grandiflora (Gray) Heller



CYPERACEAE

Carex amplisquama F. J. Hermann; Fort Mountain sedge; Sedge

Technical Description

The plants in small to large tufts, the bases leafy, covered by the fibrous remnants of old leaf bases, increasing by elongate slender stoloniferous rhizomes, these covered by shreddy-fibrous narrow, rhizome-scales.

Leaves.--Narrowly linear, 2-3 dm long, 1-2 mm broad, pale yellow-green tapering-tipped, the margins scabrous; sheathes whitish, the apex thin but firm.

Inflorescence.--Scapes slender, not much longer than the longer leaves, about 0.5 mm thick, longitudinally several-ridged, erect or arching outward. Lateral spikes strictly female, (1-) 2-3, ovoid, few-flowered, rather distant at the scape tips, the lowest with an essentially sheatheless, lance-linear, subulate bract up to 1.5 cm long, or this bract reduced, the uppermost with lowest bract shorter than the spike. Fertile female scales ovate, boat-shaped, hiding perigynes, about 3mm long, smooth acute or retuse, the margins thin, pale or greenish, the backs with a broad maroon median zone and a greenish, raised midrib, this projecting as a mucro beyond the scale tip. Perigynes about 3 mm long, the body broadly obovoid, short-stipitate, hairy, pale green, closely filled by the akene, abruptly narrowing to an oblique-tipped, mainly toothless, narrow beak about 1 mm long. Male spike short-stalked or nearly sessile, linear, 1.0-1.5 cm long, the scales narrowly ovate or oblong, acute, smooth, each with thin pale margins and a broad maroon median band, this with a whitish or pale tan raised midrib which may or may not project as a mucro.

Distribution and Flowering Season

Thus far known only from dryish sandy or rocky clearings toward or at summit of Fort Mountain, in Gilmer and Murray counties, Georgia. Flowering in late April and early May.

Special Identifying Features

This species is a part of the "Montanae" complex and is chiefly to be distinguished by its combination of a stoloniferous-rhizomatous habit with its broadish, greenish-midribbed female bracts. It is nearest C. pensylvanica in appearance and there is some question as to whether it is different from some other species in the complex.

Habitat and Management Implication

The summit of Fort Mountain occupied by this sedge has dryish, acidic sandy and rocky soil and is forested chiefly by mixed oak-pine (Virginia pine, white pines with an a mixture of sweet birch, tulip poplar, red maple, hard maple. The shrub layer is mostly ericaceous, with several species of Rhododendron, Sourwood, Vaccinium, Gaylussacia. The Carex is found in the thin shade of open forest, in moist sandy-gravelly clearings therein, or on gravelly slopes beside the highway itself. Thus, within its small area, it is found either in shade or in full sunlight. Most

robust growth appears where the overstory has been thinned by previous logging. One large part of what appears to have been former area for it has had all forest removed, has had some plowing, and has gone over largely to grass (Danthonia, Aristida, Andropogon, Panicum). It is not to be found in this large cleared place. The range of this species is so restricted and collections so few (outside the type and my own) that no substantial information on the species is as yet available.

Reference

Hermann, F. J. 1955. Rhodora 57: 157. (This is a description of the type!)

SPECIES: #23 Carex amplisquama F. J. Hermann Sedge

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage	X					X		X
No Lasting Effect								
Beneficial if Done Properly					X			

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Carex amplisquama F. J. Hermann



CYPERACEAE

Carex baltzellii Chapm. ex Dewey; Baltzell's sedge; Sedge

Technical Description

Perennial, forming tufts from spreading-ascending, scaly, fibrous rhizomes.

Leaves and Shoots.--Numerous per tuft, linear, the longest to 6 dm long, 0.5-1.0 cm broad, pale green, somewhat spreading, scabrous along the raised veins, firm, spreading, and overwintering, gradually tapering at the apex, the bases pale or straw colored. Fertile shoots up to 30 cm tall, thus exceeded by foliage leaves and forming in late winter or early spring, shorter-leaved with the lower and outer-most scale-like and pale or pale brown.

Inflorescence.--Spikes 3-5, on erect or ascending, long stalks, the lower ones often obscured in bracteal and foliage leaves, linear-cylindrical, 3-5 cm long, the terminal spike longest-stalked and exclusively of male florets, the bracts of which closely overlap, are obovate, with broadly rounded or almost truncate apices and are a rich reddish brown save for a strong, pale midnerve, this projecting as a strong mucro. Lateral spikes entirely female or female below, male at the tips.

Florets.--The bracts of the female florets also strongly overlap, hide all but the tips of the florets, and have the same shape and color as the male. The fruiting female perigynia (covering of the fruit) narrowly obovoid, about 4 mm long, tight, narrowing gradually to the base, apically to an erect, oblique and toothless beak; the body is obscurely trigonous, finely hairy, with many fine but strongly raised ribs.

Fruit.--Ripe akene dark brown, trigonous, with a short stalk.

Distribution and Flowering Season

This rare species is found in mesic sandy loamy ravines in the lower Coastal Plain in northwestern Florida, southeastern Alabama and southwestern Georgia. It begins bloom in February, fruits in April.

Special Identifying Features

Taxonomically this is closest to a more northerly sedge, C. pedunculata, which has narrower but shorter leaves, shorter spikes with fewer florets, and purplish or brownish culm bases. Superficially, and in range it is closest to C. picta Steud. in general appearance of the plant, in leaf, and in shape and color of spikes. However, this latter species is one of the few Carex which produces unisexual plants; its bases are usually reddish-tinted, its spike bracts, while strongly red-brown tinted lack the strong mucro produced by C. baltzellii.

Habitats and Management Implication

C. baltzellii is always found on moist, well-drained, humified fine sands in steep ravines whose slopes are forested with Magnolia grandiflora, Fagus, Acer saccharum (southern vars.), Nyssa sylvatica, Cornus florida, Liriodendron,

together with occasional Pinus glabra, P. taeda. The acid sands it favors are also populated with such spring flowering forbs as Hexastylis, various Trillium species, Uvularia, Viola etc., together with an abundance of other species of Carex. It has not yet been found in areas where logging has removed the dense overstory or where heavy grazing has occurred, which would lead collectors to conclude that it responds negatively to heavy or clear-cutting and grazing. It is nowhere a common plant, being known for years only from its type locality in the Apalachicola bluff country of northwestern Florida.

Reference

Small, J. K. 1933. Manual of the Southeastern Flora. 213.

SPECIES: #24 Carex baltzellii Chapm. ex Dewey, Sedge

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy	X	X	X	X		X		
Damage							NA	X
No Lasting Effect	NA				X			
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Carex baltzellii Chapm. ex Dew.



CYPERACEAE

Carex chapmannii Steud.; Chapman's sedge; Sedge

Technical Description

Perennial smooth sedge forming small to large tufts, these increasing by means of slender, spreading stolons.

Culms.--Erect from spreading, upwardly arching bases, the lower part leafy, slender, rather weak, outwardly arching, somewhat flattened and also strongly ribbed, long-sheathed, 1 rib scabrid, with most of the culm leaves subtending spikes.

Leaves.--The lowest leaves scale-like, mostly sheath, pale to dark brown. Larger foliage leaves mostly 2-3 dm long, the sheathes pale, very thin on the inner face, the outer face strongly ribbed, the blades dark green, thin, linear, tapering, lax, mostly 3-4 mm broad, strongly nerved beneath, the margin downwardly scabrid.

Inflorescence and Florets.--Lateral spikes exclusively female, the lowermost usually hidden in the clump leaves, all few-flowered, the florets either close together or with the lowermost well separate on the spike axis. Stalks of lowermost female spikes elongate, up to 8-10 cm long, very slender, weak; stalks of uppermost spikes much shorter, progressively reduced as are the subtending leafy bracts. Fertile female scales elliptic to broadly lanceolate with thin white sides and a broad, green mid-rib zone, this projecting beyond the bract tip as a flattish, green mucro. Perigynia 4-5 mm long, longer than the fertile bracts, fusiform (spindle shaped), the body with several raised nerves (2 strongly raised), yellow-green, smooth, gradually narrowing into a prominent, erect or outcurved, toothless beak. Male spikes 1.5-2.5 cm long, linear, the male bracts similar in outline and midrib to the female, short-stalked to nearly sessile, the uppermost female spike usually just beneath, its bract not overtopping.

Distribution and Flowering Season

Sandy hammocks, in the Coastal Plain, from eastern North Carolina southward and westward through northwestern Florida. Flowering in March and April fruiting through May.

Special Identifying Features

This species is in the section Paniceae, in the manuals difficult to distinguish from the closely related Laxiflorae. It is distinguished primarily for its elongate stoloniferous rhizomes projecting from the clum, its brownish culm bases, its rather long perigynes with their (usually) outcurved beaks.

Habitats and Management Implication

It frequents well-drained hammock woodlands or cleared areas of these, and is always on sands or sandy loams. A typical situation would be beech-magnolia-southern hard maple or red maple with some admixture of oak and pine. Usually it is in association with several other Carex, particularly C. laxiflora (vars.), C. dasycarpa, C. crebriflora, C. digitalis, etc. and grasses such as Uniola

and various panicums. Logging disturbance, unless accompanied by extremes of erosion or heavy grazing, usually does not affect abundance.

References

Radford, A. E. et al. 1968. Manual of the vascular flora of the carolina, pp. 234.

Small, J. K. 1933. Manual of the southeastern flora, pp. 214-215.

SPECIES: #25 Carex chapmannii Steud. Sedge

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X		X		
Damage			X					X
No Lasting Effect	NA							
Beneficial if Done Properly					X			

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Carex chapmanii Steudel



CYPERACEAE

Carex purpurifera Mackenzie; purple sedge; Sedge
C. laxiflora Lam. var. purpurifera (Mackenzie) Gleason

Technical Description

Perennial, in small tufts, the stem and sheath bases a deep purplish brown.

Culms and Leaves.--Two sorts of offshoots produced from a clump; one consists of leaves only, the lowest (outermost) mostly much shorter, mostly sheath, mostly purplish, the uppermost longest, mostly 30-50 cm long, to 1 cm broad, linear, tapering slenderly toward the apex, bright green, smooth save for the finely scabrous margins, longitudinally with 3-4 prominent veins and several less distinct ones. These leafy shoots overwinter. Fertile shoots produced in early spring, elongating to produce slender erect to spreading culms to 7 cm tall, these with basal, purplish, sheathing lower leaves, the leaves up the culm while longer never reaching half the length of leaves of sterile shoots, their sheathing bases often with purplish tints.

Inflorescence.--Mid to upper nodes of fertile shoots each producing a slender-stalked spike, the terminal one exclusively male-flowered, and densely cylindrical, 2.0-2.5 cm long, with the numerous, spirally imbricated (overlapping) scales ovate, acute to obtuse, strongly tinted with purplish brown with a paler midrib, smooth, entire, the spike stalk (peduncle) projecting the male spike beyond the tip of the subtending bracteal leaf. Female spikes usually several, shorter or longer than their subtending stalks but usually exceeded in length by the subtending bracteal leaf, the spike outline linear-cylindric.

Florets.--The florets with some overlap or somewhat loosely arranged along the axis. Ripe florets (with mature fruit) 3.5-4.5 mm long, asymmetrically broadly fusiform, the perigynial beak bowed outward, with 3 rounded angles and several low, raised longitudinal ribs, pale green, smooth. (The perigynium is the thin, usually greenish modified bract which covers all of the female flower except for the style tip which itself protrudes from a terminal hole in the perigynial beak or perigyne apex. Bracts of floret oval, slightly shorter or slightly longer than the florets, thin save for a thicker greenish midrib, the sides either pale or straw-colored or brownish-tinted, the apex acute, short-acuminate, or mucronate.

Distribution and Flowering Season

Carex purpurifera is found in rocky woodlands in the appalachian provinces from Kentucky and western North Carolina southward into northern Alabama. It begins to flower in March and fruiting material may be collected into early May.

Special Identifying Features

This species is a part of the sect. "Laxiflorae", one of the most difficult complexes in a difficult genus. Most are woodland species, several rather broad-leaved. Leaves of fertile shoots have both sheathes and leaf blades well developed,

with the solitary terminal spike strictly staminate. The fruiting perigynia are mostly ellipsoidal or fusiform, the short beaks with low teeth or none, the surfaces with raised longitudinal nerves. Many, like this species, produce sterile leafy offshoots which frequently overwinter. Within the complex there are several that have purplish bases (C. plantaginea, C. careyana, C. gracilescens). Of these, C. gracilescens Steud. (C. laxiflora Lam. var. gracillima (Boot.) Robins. & Fern. is nearest taxonomically differing only in its shorter perigynia, its more slender somewhat lower habit, its somewhat narrower leaves.

Habitats and Management Implication

C. purpurifera is usually found in the ecotone between rich mixed mesophytic cove woods and the largely oak - hickory of upper ravine slopes. It is often along the transition zone between calcareous underlying rock and argillaceous or sandy parent material. Very often it is amongst outcrops, in talus, or in very rocky soils in pockets of loam, always on well drained substrata and in open woods. It, together with other woodland sedges and forbs tends to be reduced or lost in clear-cut areas, probably because of a complex of factors involving too much light and heat, attendant soil erosion, and invasion of weedy forbs, vines, etc. with which it cannot compete. It is lost in grazed woodlots. Management involving the least impact on the soil and the light factor would favor it most, this management involving either selection or group selection.

References

- K. K. Mackenzie, 1935. Carex in North American Flora 18 (5):241-312
(Continuation)
- J. K. Small. 1933. Manual of the Southeastern Flora, pp. 216-218.

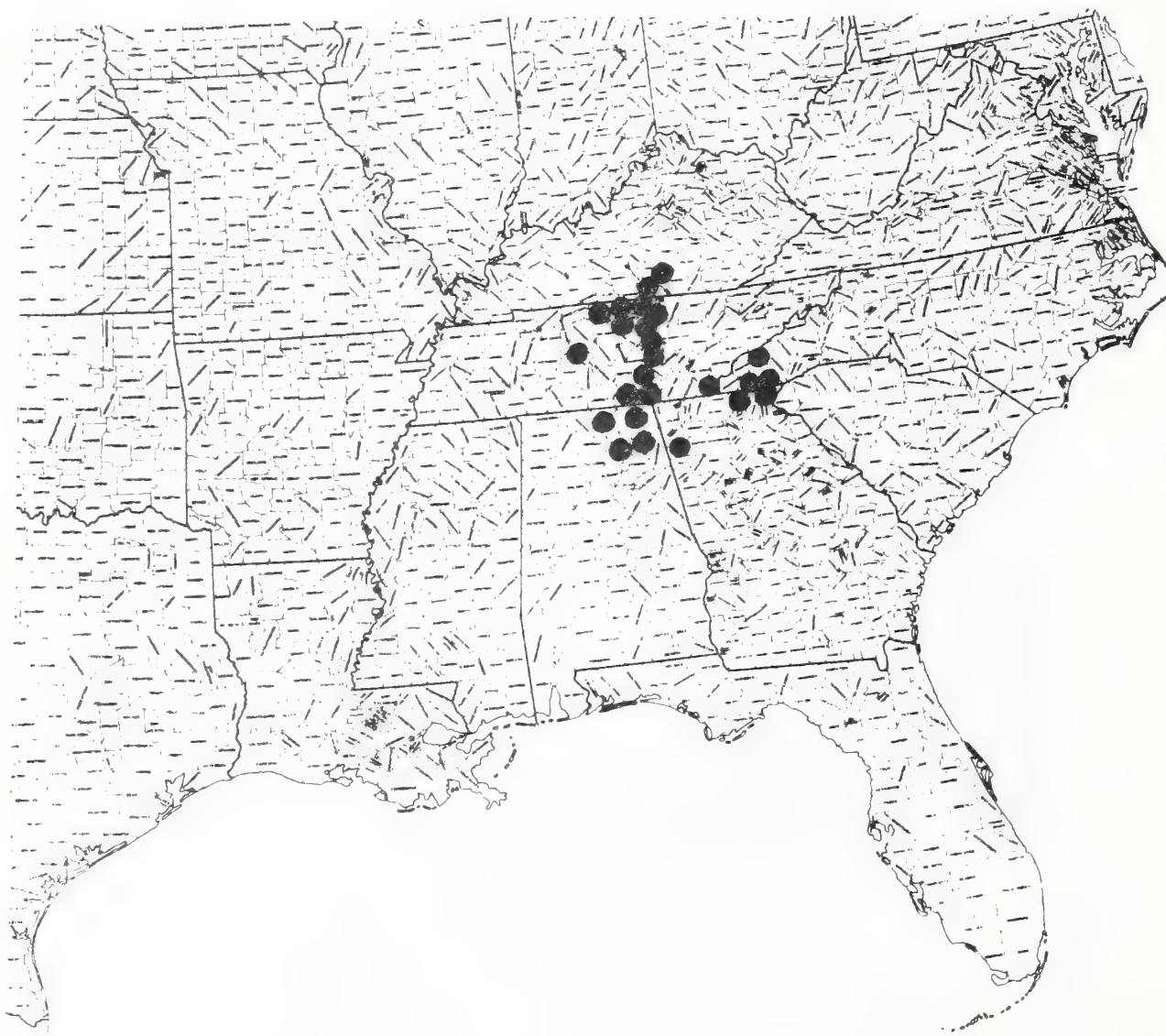
SPECIES: #26 *Carex purpurifera* Mackenzie Sedge

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy						X		
Damage								X
No Lasting Effect	NA							
Beneficial if Done Properly					X			

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Carex purpurifera Mackenzie



CYPERACEAE

Cymophyllus fraseri (Andr.) Mackenzie; Fraser's sedge;
Sedge
Carex fraseri Andr.

Technical Description

Perennial, usually in large tufts of several, close-set rhizomal offshoots. Stems and Leaves.--Each offshoot with several leaves, the lowest pale, straw-colored or nearly white toward the base, loosely sheathing the flowering shoot, cylindrical but expanding above at the pale green oblique-bluntly triangular-bladed orifice. Uppermost leaf by far the largest, its base pale, inrolled-sheathing, dilating and spreading above to a broadly linear green blade to 6 dm long and 2-5 cm broad; this blade has smooth, very finely ribbed surfaces, a thinnish, puckered margin and an acute or short-acuminate apex and persists over winter. The flowering shoot is stiffish but slender, pale green or near white, its base encased in leaf sheath, its total length less than or slightly longer than the subtending foliage leaf and at its tip bearing a single short-oblong, naked (bractless) spike about 2.0-2.5 cm long.

Inflorescence and Florets.--The base of the spike produces several spreading, broadly fusiform, whitish perigynia (as in Carex) about 5 mm long in fruit; the perigynium is thinnish, very faintly nerved. Above the middle of the spike all flowers are male, their thin oblong, acute bracts closely imbricated in several spirals, the filaments and anthers whitish and projecting beyond in flower. Female scales ovate, very thin, near-white, about as long as or distinctly shorter than the ripe perigynia.

Fruit.--Ripe akene trigonous, lustrous brown, the sides concave.

Distribution and Flowering

Rich, usually rocky woods in full shade in the mountains from eastern Kentucky, southwestern Virginia and West Virginia southward to western North Carolina and eastern Tennessee. It blooms from May to July.

Special Identifying Features

This species has no near relatives and its phylogeny is argued. At a distance it is often confused with some liliaceous plants because of its tufts of broad, brightish green leaves and particularly because of its chalk-white flowering inflorescences. Some botanists place the species in Carex, in that it does produce the perigynium.

Habitats and Management Implications

C. fraseri appears to require a highly humified, moist (though well-drained), slightly acidic substrate and a humid atmosphere. It is found in mixed-mesophytic forested or boreal-transitional forested areas that usually remain cool and humid even in summer. Generally it is at elevations of at least 2,000 ft. It is another species that responds negatively to clear-cutting, being a plant of at least semi-shade and evidently responding poorly to the admission of light and the

sort of weedy herbaceous and woody species that invade after a clear cut. It disappears from grazed woodlands.

References

M. L. Fernald. 1950. Gray's Manual of Botany, ed. 8. 293.

J. K. Small. 1933. Manual of the Southeastern Flora, pp. 235-236.

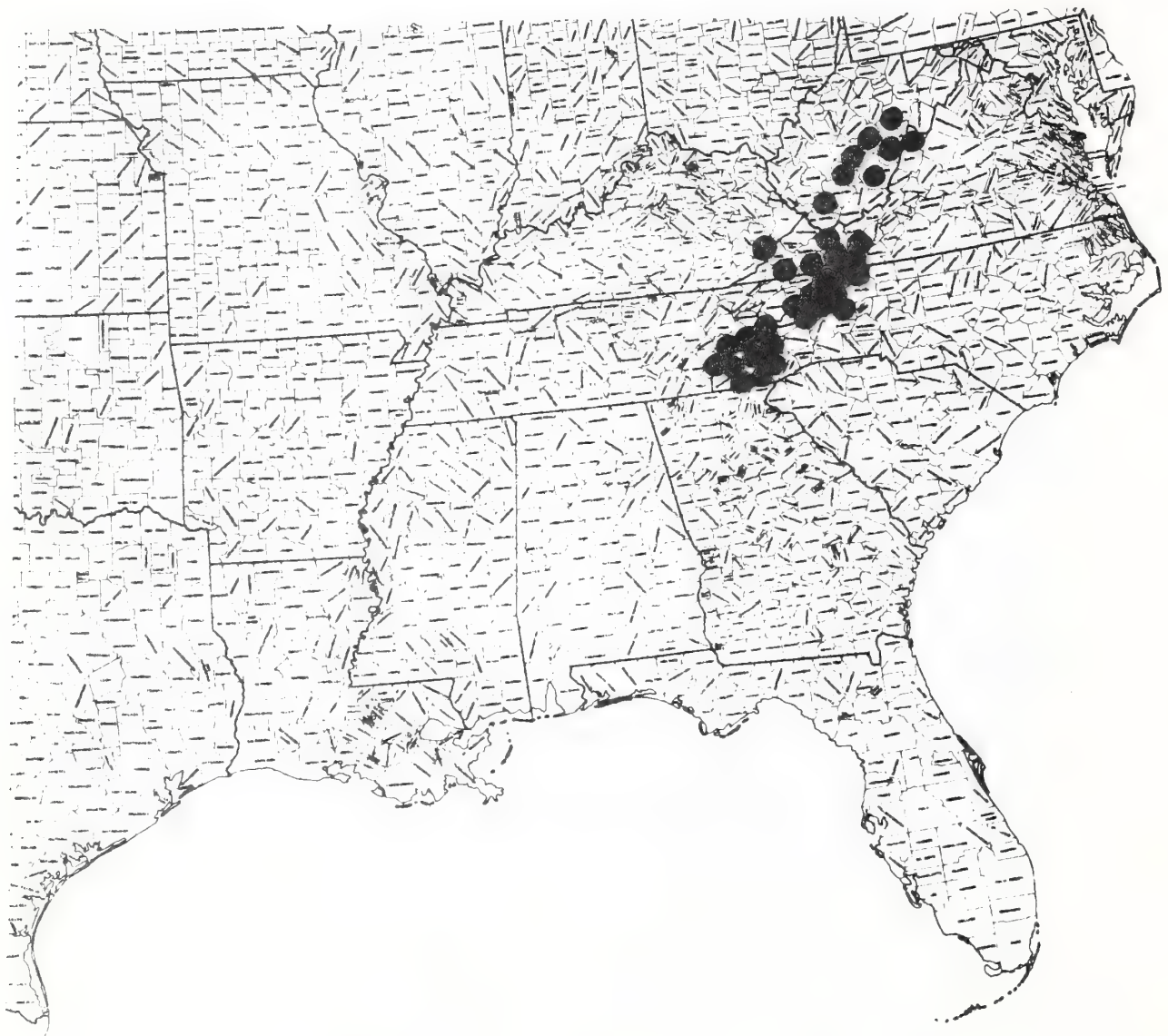
SPECIES: #27 Cymophyllus fraseri (Andr.) Mackenzie, Sedge

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy					X			X or
Damage								X
No Lasting Effect	NA			X				
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Cymophyllus fraseri (Andr.) Mack.



ERIOCAULACEAE

Lachnocaulon beyrichianum Sporleder ex. Korn. southern
bog buttons; hairy-Pipewort or bog-buttons

Technical Description

Perennial herb, forming large shallowly domeshaped clumps of rosettes which cover a multibranched system of chaffy short stems.

Leaves.--Narrowly linear-attenuate, to 4 cm. long, grayish green, hairy, with sheathing bases.

Inflorescence.--Scape sheathes slender but loose, about as long as leaf blades, hairy with long crinkled hairs. Scapes 15-24 cm. long, slender, twisted, obscurely ridged, hairy with long translucent hairs, thus appearing grayish. Mature heads globose or short-oblong, pale-gray, 3.5-5.0 mm. broad. Outer involucral bracts ovate, about 1 mm. long, brownish, smooth or fringed with small clubshaped pale hairs on the backs and apically. Bracts of receptacle surface fiddleshaped, 1.5-2.0 mm. long, obtuse, brownish, basally smooth, hairy on the backs towards the tips with short, whitened, clubshaped hairs.

Flowers.--Male flower with 3 linear-spatulate sepals 1.5-2.0 mm. long, obtuse, brownish, hairy with white clubshaped hairs on the backs towards and at tips; androphore (stalk supporting stamens) smooth, clubshaped, about as long as sepals; anthers yellowish, slightly exerted. Female flower: sepals linear or linear-spatulate, about as long as but broader than male sepals, obtuse, tan or pale brown, backs and margins pilose, hairs toward apex white and club shaped; gynophore (stalk supporting ovary) short, densely hairy at base; carpels 3. ovary 3-locular, 3-ovulate, styles 3, branched.

Fruit.--Seeds ellipsoidal, somewhat flattened, reddish-brown, about 0.5 mm. long, very lustrous.

Distribution and Flowering Season

Sands, sandy peats and peat of pine flatwoods, savannas, and rather dry oak-pine barrens, southeastern North Carolina southward into central Florida. Flowering from May to frost, given proper weather conditions.

Special Identifying Features

These and related genera are often called "bog batchelor-buttons" or "hatpins" because of the slender scapes arising from rosettes and terminating in button-like heads of chaffy bracts and florets. The Lachnocaulons differ from Ericaulons mainly in their more slender rootsystems of non-partitioned roots, their comparatively hairy foliage and scapes, their perianths which are usually 3-parted rather than 2-parted, and their tendency to be found often in drier sites than most Ericaulon, mainly have 2 carpels and a 2-branched style whilst Lachnocaulons mainly have 3 carpels and 3 style branches.

Habitats and Management Implication

Lachnocaulon beyrichianum looks most like L. anceps, a wide ranging Coastal Plain species with larger, paler heads, larger perianth parts, broader leaves, and less lustrous seed. The two are often found in the same area, but L. beyrichianum in these cases is on higher, drier sites. Typical habitat for it is in dryish acidic white sands or sandy peats of clearings in longleaf or slash pinelands. It may appear in mature open stands of pine, but is shaded out of heavily stocked younger stands. Of the Eriocaulaceous plants it is least effected by drainage. Common associated herb and shrub genera are Andropogon, Aristida, Xyris (X. carolinensis), Polygala (those of drier sands), Rhexia, Heterotheca (mostly Graminifolia types), Panicum (Dichanthelium), Bulbostylis, Serenoa, Ilex (gallberry), Myrica, Lyonia. It probably maintains in nature through periodic burnings which would remove some grass-sedge competition and create forest openings. Site preparation methods, so long as they do not involve total drainage, probably favor this species so long as there are contiguous seed sources. However, it is shaded out later as the crowns of seeded or planted pines close.

References

- Kral, R. 1966. Eriocaulaceae of continental North America north of Mexico. *Sida* 2 (4): 285-332.
- Moldenke, H.N. 1937. Eriocaulaceae in N. Amer. *Fla.* 19 (1).
- Small, J.K. 1933. Flora of the southeastern United States, pp. 255-256. Chapel Hill, N.C.

SPECIES: #30 Lachnocaulon beyrichianum Sporleder ex Korn. Hairy-Pipewort

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Lachnocaulon beyrichianum Sporl. ex Korn.



EUPHORBIACEAE

Euphorbia telephoides Chapm. Spurge
Galarhoeus telephoides (Chapm.) Small

Technical Description

Perennial smooth, milky-juiced herb from a thickened, deep-set woody rootstock.

Stems.--Stems arising usually well below-ground, solitary or several, close-set toward apex of thickened crown, erect or ascending, at most to 3 dm high, terete, sometimes branching at base, otherwise simple except in the inflorescence, the above ground parts often tinged with red, distally green, there with decurrent ribs from leaf midrib bases.

Leaves.--Numerous, alternate-spiral, on main axis, opposite in inflorescence, the lower ones triangular, scale-like, the largest at midstem or directly beneath inflorescence branches, broadly obovate to suborbicular, broadly spatulate, elliptic or oblanceolate, mostly 3-6 cm long, rounded to broadly acute or obtuse-angled, entire, the base cuneate or short-attenuate, sessile or nearly so, or in uppermost leaves and bracts clasping and with blades narrowly ovate or triangular; leaf surfaces deep to pale yellow-green or suffused with maroon, the midrib and margins usually maroon.

Inflorescence.--Broader than long, a compound of leafy-bracted cymes of cyathia (the cyathium is a cup-shaped involucre bearing inside, usually, few to several male flowers comprised mainly of stamen and one stalked female flower which at maturity projects, and bearing around its margin appendaged or unappendaged, often petal-like, glands; in this complex of species the glands are unappendaged), these in bloom top-shaped, maroon, 2.5-3.0 mm long, bearing on their rim 4, short-stalked, half-round, fleshy, greenish-maroon glands alternating with 4 erect, red, roundish to obtuseangled, scale-like ciliate-fimbriate appendages nearly as high as the glands, the whole cyathium on a slender maroon stalk mostly 3-10 mm long and frequently concealed by the leafy subtending bracts.

Fruit.--Capsules in outline reniform, ca. 6-8 mm broad and 5 mm high, strongly 3-lobed, each lobe keeled, the keel edge maroon, the surfaces otherwise dull green, minutely pebbled. Seeds 1/locule, nearly round, ca. 3 mm across, gray or gray-brown, smooth to minutely pebbled.

Distribution and Flowering Season

Sandy longleaf pineland, low sandy ridges, mostly near the coast, northwestern Florida; flowering mostly from April into July, but if disturbed blooming throughout the growing season.

Special Identifying Features

This species is nearest E. inundata Torr. a taller plant of moister habitats, usually moist to wet pine flatwoods savannas and hypericum pond borders from northwestern Florida to southern Alabama. E. inundata is normally bushier, with leaves ranging narrower; its inflorescence is more diffuse, the cyathia more numerous on longer stalks; the cyathial glands are fleshy and obliquely truncated, entire or nearly so as in E. telephoides, but the scale-like

cyathial appendages tend to be lacerate-fimbriate and with mucronate apices.

Habitat and Management Implications

E. telephoides is mostly either in wire-grass dominated longleaf pine-slash pine savanna or on the low sandy rises contiguous, these usually dominated by turkey oak and other scrub oaks interspersed with pine. In either case the deep woody rootstock extends down into a dark moist sand. Serenoa is abundant throughout, as are Conradina, Hypericum, Yucca. Grasses in Panicum, Aristida, Sporobolus, Muhlenbergia, Anthenantia, Sorghastrum dominate, interspersed with Xyris caroliniana, many Polygala, Rhexia alifanus, and an abundance of composites in genera Chrysopsis, Aster, Solidago, Liatris. Phoebanthus tenuifolius is an almost constant associate.

Natural woods fires probably maintained this species historically, in that burning reduces woody competition and increases the wire-grass area. Most herbarium specimens of E. telephoides show some evidence of fire disturbance. Many cormophytes such as this one respond vigorously after a burn; certainly controlled burning would tend to increase abundance. Neither are most mechanical site preparatory techniques fatal, in that a number of the deep rootstocks survive to produce vigorous shoots. However, the purpose of such preparation is to develop plantations of slash pine, and as soon as the crowns of the young pines close E. telephoides is shaded out.

Reference

Small, J. K. 1933. Manual of the southeastern flora, pp. 800-801. Chapel Hill, N. C.

SPECIES Euphorbia telephoides Chapm. Spurge

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy							X	
Damage No Lasting Effect		X	X	X				X
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Euphorbia telephoides Chapm.



FABACEAE

Astragalus tennesseensis A. Gray; Tennessee milkvetch; Milk vetch
Geoprunon tennesseense (A. Gray) Rydb.

Technical Description

Perennial herbs from strong, stout taproots.

Stems.--Usually several, arising from short, stoutish branches at summit of taproots, usually spreading over the ground, arching upward toward the tips, mostly 2-7 dm long, pale green or straw colored, simple or sparingly branched, with several close-set leafless nodes toward the base, thickening upward, there densely long-spreading-hairy with whitish hairs.

Leaves.--Alternate, even-pinnate with stipules pale green, thin, ovate, acuminate,, ciliate, about 1-2 cm long, leaf rachis spreading, 5-15 cm long, long-spreading-hairy, less than 1/2 petiole; leaflets between 10 and 20 pairs, spreading on short (ca. 1mm.), hairy stalks, mostly elliptic or oblong, 5-15 mm long, the apices rounded or emarginate, often with a small mucro, the margins entire and long ciliate, the upper surfaces dark yellow green, smooth, the lower surfaces with long, appressed hairs.

Inflorescence.--Flowers in long-stalked compact racemes from the axils of mid-stem leaves upward, the stalks spreading-ascending, spreading-long-hairy, mostly 5-10 cm long, the racemes ovoid or cylindric, mostly 3-8 cm long, each flower with a pale green, thin, erect lanceolate or narrowly ovate, acuminate, long ciliate bract 5-10 mm long and on a short stalk 1.5-2.0 mm long.

Flower.--Calyx narrowly campanulate, long-hairy, 5-lobed, the tube 8--10 mm long, yellow-green, the lobes unequal, narrowly triangular to nearly linear, green, to 3 mm long. Corolla pale yellow, pea-like but narrow, the standard longest, bent upward toward its tip, narrowly obovate, retuse, 1.5-2.0 cm long; wing petals long clawed, the blades oblong, rounded-tipped; keel petals shortest, sharply bent upward. Stamens 10, hidden by the petals, 9 joined by their filaments most of the length, the 10th distinct, all smooth. Ovary superior, hairy, narrow, the style bent upward at its tip.

Fruit.--Narrowly ovoid-cylindric, 3.0-3.5 cm long, long beaked, vary thick-walled and fleshy, persistently long-hairy, becoming brownish and wrinkled when fully ripe. (Racemes of fruit are usually persistent long after the leaves have withered, lying flat on the ground with the browning remnants of stems and leaves).

Distribution and Flowering Season

Dry calcareous prairies and barrens, northern and central Illinois; middle Tennessee; northern Alabama. Flowering April into May.

Habitat and Management Implication

This species, wiped out or nearly so in its Illinois range, is now most abundant (through local) in the cedar glades of middle Tennessee, less so in small or large clearings in limerock woods. It is a plant of full sun or very light shade, usually on very thin soils over limestone and associated with other calciphiles such as Psoralea subacaulis, Delphinium virescens,

Petalostemon, Onosmodium, Arenaria patula, Talinum, various carices and grasses. The woodlands associated with the clearings are marked by Juniperus virginiana, Quercus shumardii, Q. muhlenbergii, Q. alba, Morus rubra, Ulmus serotina U. rubra, U. Americana, Carya ovata, C. carolinae-septentrionalis, Rhamnus, Fraxinus, with Rhus aromatica and Symphoricarpos common in the understory. The soils, while fertile, are thin and poorly drained, being sticky clay in winter and spring, drying to bricklike consistency in summer and fall drought.

A. tennesseensis, a plant of open areas, may increase as clearings are produced through logging. Its decrease over the total range is probably due mainly to conversion of the land to row crops or pasture on the one hand and the encroachment on its area by scrub forest on the other. Historically it may have been maintained through summer and autumn fire.

References

- Quarterman, Elsie. 1950. Major Plant Communities of Tennessee Cedar glades. Ecology 31: 234-254.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 708-709.

SPECIES: #34 Astragalus tennesseensis A. Gray. Milk vetch

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		NA					X	
Damage								
No Lasting Effect	NA							Poisonous
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Astragalus tennesseensis A. Gray



FAGACEAE

Quercus oglethorpensis Duncan. Oglethorpe Oak

Technical Description

A medium-sized to large tree (to 25 meters tall).

Stems.--The bark on older trunks platey, gray (as in Durand Oak, White Oak, etc.) New shoots with scattering of stalked stellate hairs, later becoming smooth or nearly so, somewhat lustrous, reddish-brown. Winter buds with terminals about 3 mm long, ovoid, bluntish, dull reddish-brown, the inner scales conspicuously low-ciliate.

Leaves.--Spreading on smoothish, short petioles (3-8 mm long), deciduous, the blades from oblong to narrowly elliptic or oblanceolate, mostly 5-10 cm long, (similar to willow-leaved oaks), the tips prickle-less, rounded to obtuse-angled, the margins entire or rarely with a few low, sinuate lobes, slightly emarginate, the bases acute or cuneate, the upper surface yellow-green, somewhat lustrous, the lower surface more yellowish, sparsely to densely covered with short-stalked, stellate and tan hairs.

Fruit.--Acorn about 1 cm long, nearly sessile, maturing in 1 year, the cup 1/2 or less as long as the nut, thinnish, turbinate, about 1 cm broad, the numerous narrow cup scales tightly appressed, dull reddish-brown, tomentose with short weak hairs toward their bases, thinner, paler and less hairy toward their narrow but blunt tips, those of the margin erect, the rim of the cup not fringed: nut round or ellipsoidal, dull brown or tan, with a scattering of appressed, weak hairs over the shell.

Distribution and Flowering Season

Poorly drained bottoms and adjacent slopes, in the Piedmont from western South Carolina south into eastern Georgia.

Special Identifying Features

This oak is taxonomically closest to the Durand Oak, differing from it only in slight ways, such as in the darker colored leaf hairs, the slightly smaller fruit, and perhaps should be considered a mere variant of that species, particularly if ones concept of Durand Oak includes Q. austrina.

Habitats and Management Implication

It is found in poorly drained alluvial sites, mixed with other bottomland species of oaks, particularly the willow oaks, and various species of ash, elm, hickory.

Management should be as for other bottomland oaks, but owing to the scarcity of the species, every effort should be made to preserve the specimens. No observations as to its silvicultural characteristics are available to this reporter.

References

- Duncan, W. H. 1940. A new species of oak from Georgia. Am. Midl. Nat.
24: 755-756.
- Radford, A. E. et al. 1968. Manual of the vascular flora of the Carolinas,
pp. 372-385. Chapel Hill, N.C.

SPECIES: #36 Quercus oglethorpensis Duncan. Oglethorpe oak

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy								
Damage								
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

No doubt behaves as do others of the bottomland white oaks and would be managed accordingly, but with particular attention to reproduction in that this tree appears to be quite scarce! Now reported from IA.

Quercus ogelthorpensis Duncan



MAGNOLIACEAE

Schizandra glabra (Brickell) Rehder. Smooth magnolia vine;
bay Star-vine or Wild Sarsaparilla
(S. coccinea Michx.)

Technical Description

A woody vine, both twining and clambering on both understory and overstory shrubs and trees.

Stems.--Bark pale gray-brown, smooth, interrupted by raised, largish, tan, lenticels. Winter buds ca. 4 mm long, ovoid, sharp-tipped, reddish-brown, imbricate-scaled. Leaf scars elevated, round, with 3 bundle traces toward the center; stipular scars lacking.

Leaves.--Produced alternately on shortish, stout knobby spur shoots or on long shoots, are smooth, deciduous, thin, mostly obovate or elliptic, to 10 cm long, acuminate, the edges above the mid-point low-toothed, the bases gradually or abruptly narrowed to slender stalks up to 4 cm long.

Flowers.--The flowers, produced singly from leaf axils, are on spreading-drooping slender stalks up to 5 cm. When fully open they are somewhat flattened as in strawberry bush, in outline round, about 1.5 cm. wide, the sepals mostly short-oblong, round-tipped, yellow-green, the petals broadly elliptical or short-oblong, a maroon color (much like those of Anise-tree). The flowers are unisexual, usually both developing on the same shoot with female usually opening first. The stamens are joined together into a flattened 4-6-notched disc with the anthers borne along the sides of the narrow notches. The ovaries are numerous (as in buttercup, blackberry), small, raised on the receptacle which elongates after fertilization.

Fruit.--The fruit is of berries, borne like narrow bunches of grapes along the fruiting axis. Each berry has two seeds, is roundish, yellow-green when ripe, and ca. 1 cm long. No parts of the plant are edible.

Distribution and Flowering Season

This vine occurs naturally only in the Atlantic and Gulf Coastal plains from North Carolina south to northern Florida, west to Louisiana and up the Mississippi Embayment into western Tennessee and east Arkansas. In Alabama it is found inland to the southern tip of the Appalachians in Bibb County. It blooms from late June to August.

Habitat and Management Implication

S. glabra, or wild sarsaparilla, is always in heavy woods, usually in the understory, usually in bottomlands or in the bluffs along creeks and rivers generally on rich sandy-silt-loams. The forests it frequents are almost always mixed-mesophytic. Selective cutting of such areas should not effect the vines, but clear-cutting would adversely effect this shade tolerant species, in that it

is a plant usually of steepish terrain or in bottoms where heavy logging and subsequent erosion would have a negative effect.

Reference

Small, J. K. 1933. Manual of the Southeastern Flora, P. 534. Chapel Hill, N.C.

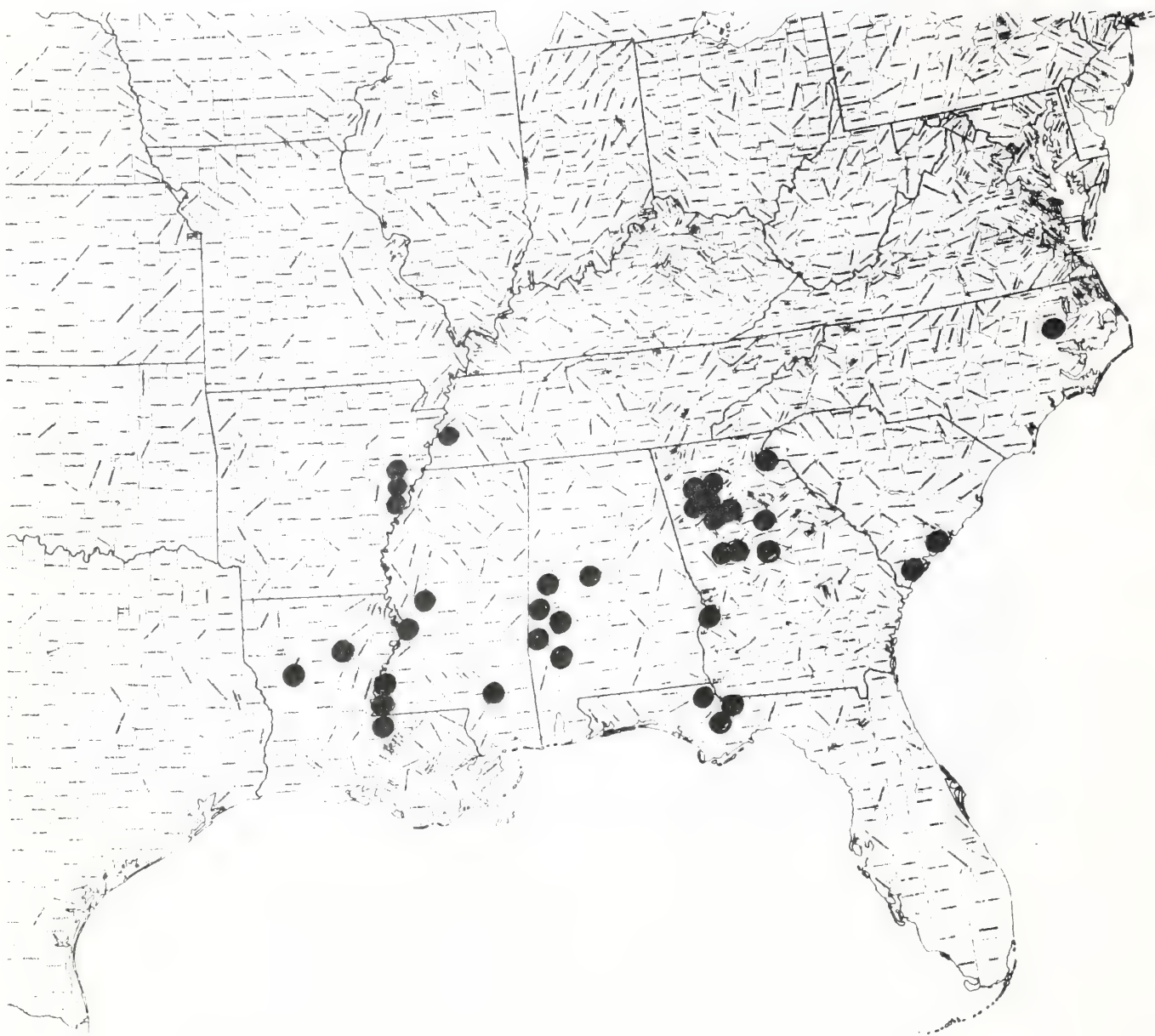
SPECIES: #37 Schizandra glabra (Brickell) Rehder, Bay star-vine or Wild sars

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy								
Damage						X		
No Lasting Effect	NA	→					NA	
Beneficial if Done Properly					X			

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Schizandra glabra (Brickell) Rehder



ASTERACEAE

Marshallia ramosa Beadle & F. E. Boynt. Southern barbara's-
buttons; Barbara's buttons

Technical Description

Perennial from a short erect caudex, the roots thickish.

Stems.--Erect, 3-7 dm long, slender but stiffish, angled or finely fluted, yellow-green with (often) tints of maroon below, the lower part smooth, the upper part smooth or with scattered short, crisped hairs.

Leaves.--Both in rosettes and on the stem, the lowest largest, with blades from elliptic to oblanceolate, linear or elliptic-linear, variable in length from 5-20 cm the apices rounded even if narrow, the margins entire, the surfaces yellow-green, smooth, triple-nerved, the bases attenuated to an ascending maroon petiole less than 1/2 the blade in length.

Inflorescence.--Branches (peduncles) arising from about mid-stem upward from the axils of much smaller upper stem leaves, slender, elongate, short-bracted, with a scattering of short, crisped hairs, upwardly arching candelabra-like to produce a more or less open, flat-topped cyme. Heads/inflorescence mostly 3-9, usually but one terminating a branch (rarely 2), mostly hemisphaeric, from base to bract-tip 5-7 mm high, 10-12 mm across, in flower from head base to corolla tips 10-15 mm and 15-20 mm across. Bracts of head several, loosely imbricated in 2 weak series, elliptic linear to oblanceolate, 5-7 mm long, acute or mucronate or short-acuminate, greenish, entire with narrow pale margins.

Flowers.--All discoid, all fertile, the corollas 6-7 mm long, with a long, slender tube, a short, campanulate throat and 5 long, slender spreading lobes, pale lavender and covered externally with pale crisped hairs. Anther head projecting conspicuously above the spreading petal lobes, a deeper lavender.

Fruits.--Akene broadly wedge-shaped, angled (prismatic), about 2 mm long, the angles ascending-bristly-hairy, the tip capped by a crown of narrowly triangular, acute to slender-tipped, thin scales, these often bronze with purplish tints.

Distribution and Flowering Season

Dry to moistish sandy outcrops or sandy rises in longleaf wiregrass pinelands, south-central Georgia and northwestern Florida (Washington County); flowering from late May through June.

Speical Identifying Features

In appearance of leaves it is nearest M. graminifolia and M. tenuifolia, which do overlap its range, but these plants do not bloom until late summer and fall. In character of pappus (scales) it is nearest M. caespitosa, but this complex species is always west of the Mississippi River.

Habitats and Mangement Implications

This species is thought to be confined to and around the Alatomaha Grit outcrops of south-central Georgia and its one outcrop occurrence in north-

west Florida (Rock Hill). This is a highly ferrugineous sandrock, and the plants are usually rooted in pockets thereon, or nearby. The same situations harbor the also rare (and threatened) Penstemon dissectus. M. ramosa, though considered rare, is locally abundant and forms small, but showy patches within its small range. It is usually in full sun, associated with wiregrass or with grass-sedge and other savanna formation plants where the overstory is mainly a scattering of longleaf pine, or it may actually be found on bog edges in more humified sands. Its being on and around outcrops protects it from most agricultural activity save for pasturing. Prescribed burning would probably favor the species, together with the other savanna formation forbs it associates with. Removal of the sparse pine overstory would probably increase its local area. Most methods of site preparation would be inapplicable in its habitat, though plantings of slash pine have to some extent been intrusive. Where such plantations are developed, this species is eliminated through shade, at least until such time as planted stands "open up."

References

- Channell, R. B. 1956. A revisional study of the genus Marshallia (Compositae),
Contribs. Gray Herb., CLXXXI: 41-132.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1455-1457. Chapel Hill, N.C.

SPECIES: #38 Marshallia ramosa Beadle & F. E. Boynt. Barbara's buttons

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy				X			X	
Damage								X
No Lasting Effect			X					
Beneficial if Done Properly	X	X			X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Marshallia ramosa Beadle & Boynt.



BRASSICACEAE

Lesquerella globosa (Desv.) Wats. Globose bladderpod;
bladder-pod

Technical Description

Perennial or annual herb from a very stout taproot or a woody caudex.

Stems.--Usually numerous, giving plant a bushy appearance, arching shortly outward in all directions from the plant base, becoming erect, to 5 dm. long, terete, grayish because of a rather dense covering of simple and stellate hairs, the simple hairs attached at mid-point.

Leaves.--Numerous, mostly crowded along the stem from base to inflorescence, the lowest sometimes withered by flowering time, these usually longest and long-petiolate, with oblong, oblanceolate or elliptic blades 3-4 cm. long, the apices broadly acute or bluntish, the margins entire, undulate, distantly dentate, (rarely nearly pinnatifid) often emarginate, the bases cuneate or attenuate to petioles up to $\frac{1}{2}$ as long as the blade, the surfaces gray-green because of a liberal coating of appressed-stellate-hairs. Leaves becoming gradually narrower and more sessile, shorter up to the stem to the inflorescence.

Inflorescence.--Of several to very many regular flowers on mostly spreading slender pedicels longer than themselves, forming a more or less elongate raceme.

Flowers.--Sepals 4, elliptic to obovate, 2.5-4.0 mm. long, the laterals with sac-like bases, mostly nearly erect in flower, the backs finely stellate-hairy, pale yellow-green. Petals 4, obovate, 3.5-7.5 mm. long, spreading-bladed, margins sinuate, the surfaces a bright yellow. Anthers linear, erect on 6 filaments, 2 usually shorter, the filament bases flattened and dilated. Ovary globose or nearly so, its surface densely stellate-hairy, the style much longer, fully 2 mm. long.

Fruit.--Globose, about 2.0-2.5 mm. long with a scattering of stellate hairs, the margins of the 2 valves somewhat raised along contact; partition of fruit thin but continuous; style persistent. Seeds 2/locule of fruit, dimorphic, from oblong to nearly round, 1 side or the other often more convex, wingless, 1.0-2.5 mm. long.

Distribution and Flowering Season

River bluffs, talus of lower bluff slopes or calcareous soils of clearings, middle Tennessee north through north central Kentucky into Posey County, Indiana. Flowering from March through May.

Special Identifying Features

This species is to be distinguished from other southeastern area Lesquerella by its often perennial habit, its greater stature, its small rounded siliques which have stellate hairs and its widely spreading flower and fruit stalks.

Habitats and Management Implications

The habitats of the species are varied but it is most common either in full sun or in light shade on the limestone ledges along major streams such as the Cumberland. Here it may form locally heavy patches as well as the jumble of talus at bluff bases. It has also been found in pastures amongst scattered Juniperus. Wherever it is found in shade, some of the shade is contributed by juniper, along with such species as oaks (mainly Q. shumardii, Q. muhlenbergii, Q. imbricaria, Q. alba), hickories, and ash, particularly the Blue and White. It may be amongst a scattering of shrubs such as Rhus aromatica, Forestiera ligustrina, Rhamnus. Its soils are always over limestone, are usually thin, heavy, often quite dry. In most cases the sites this plant frequents are steep, very poor for timber and, where desirable oak or juniper is present, would probably be cut selectively if at all. However, removal of the overstory to expose the limestone bluffs and outcrops would probably not promote increase of the species.

References

- Rollins, R.C. 1955. The auriculate-leaved species of Lesquerella (Cruciferae). Rhodora 57:241-264.
- _____ and E.A. Shaw. 1973. The genus Lesquerella (Cruciferae) in North America. pp. 1-288. Cambridge, Mass.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 555-556. Chapel Hill, N.C.

SPECIES: #42 Lesquerella globosa (Desv.) Wats. Bladderpods

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy						X		
Damage								X
No Lasting Effect	NA						NA	
Beneficial if Done Properly					X			

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Lesquerella globosa (Desv.) Wats.



BRASSICACEAE

Lesquerella lescurii (Gray) Wats. Nashville bladderpod;
bladderpods

Alyssum lescurii (Gray) Gray

Technical Description

This herb is similar in most ways to L. densipila (which see) but mostly somewhat lower, rarely with stems longer than 2 dm., and stem leaves with margins more consistently low-toothed. Significantly differing in the fruit, which is orbicular or slightly elliptical, 4-7 mm. long, definitely compressed, the valve surfaces covered with a mixture of pustular-based long trichomes and shorter branched hairs; septum of fruit complete. Seeds 2-4/locule, 2-3 mm. long, flattened and margined.

Distribution and Flowering Season

Open riverbottom fields and pastures, roadbanks, clearings and lots, in full sun and on alluvial clay, occasionally on thin soils over limestone outcrops, through most of middle Tennessee and particularly along the major drainages southward into northern Alabama (Limestone County). Flowering from March through April.

Habitat and Management Implication

This species is probably the most abundant in Davidson and Cheatham Counties of middle Tennessee where it is sometimes an aspect dominant in patchy lawns, in empty lots, or in riverbottom fields. It is definitely a lower successional level species, giving way to perennial forbs, ultimately to hardwood forest. It is known to hybridize both with L. densipila and the very local, white flowered L. stonensis. Much of the area in which it frequently abounded has gone over to housing, such developments being its major threat. It is maintained through that sort of natural or artificial disturbance that would keep an area of calcareous low soils open, relatively free of perennial forbs or forest.

References

- Rollins, R.C. 1955. The auriculate-leaved species of Lesquerella (Cruciferae) Rhodora 57:241-264.
- _____ and A.E. Shaw. 1973. The genus Lesquerella (Crudiferae) in North America. pp. 1-288. Cambridge, Mass.
- Small, J.K. 1933. Manual of the southeastenn flora, pp. 555-556. Chapel Hill, N.C.

SPECIES: #43 Lesquerella lescurii (Gray) Wats. Bladderpods

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								X
No Lasting Effect	NA							
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Lesquerella lescurii (Gray) Wats.



BRASSICACEAE

Warea amplexifolia (Nutt.) Small; clasping warea

W. auriculata Shinnars

Technical Description

Smooth, taprooted annual.

Stems.--Mostly 3-10 dm. long, erect, terete, the lower part brownish with shallow cracks, upwardly becoming greenish, shallowly grooved, branching from the middle, the branches spreading, then arching upward, or unbranched.

Leaves.--Alternate, the lowest absent by flowering time, the largest lowest, all rather closely spaced, ovate or elliptic, mostly 2-3 cm. long (progressively smaller and more distant upward on the stem and branches), acute, entire, the bases deeply auriculate-clasping.

Inflorescence.--Racemes rather short and broad, terminal to main stem and branches, the flowers symmetrical, close-set, spreading on slender stalks 1.0-1.5 cm. long.

Flowers.--Sepals 4, linear-spatulate, 5-6 mm. long, erect in bud, later reflexed, greenish with lavender tints. Petals 4, 8-10 mm. long, spreading-ascending, lavender-rose, the broadly obovate blades 3.0-3.5 mm. long on slender claws with papillate bases. Stamens 6, erect or ascending, the slender lavender filament projecting the linear, curved anthers well beyond the petals. Ovary erect, linear, on a stalk fully half as the filaments.

Fruit.--Linear, on spreading stalks, usually curved, 3-5 cm, long, laterally flattened.

Distribution and Flowering Season

Sand ridges, sandy open-pine scrub, central peninsular Florida; flowering from mid-summer through September.

Special Identifying Features

This species is nearest W. sessifolia Nash (which see), but the leaves are deeply auriculate-clasping (rather than just sessile) and the petal claws are not as roughened basally. The two do not overlap at all in range.

Habitats and Management Implication

This, like all Warea, is a plant of nearly pure sands, is locally abundant in both turkey oak-Longleaf pine and sand pine-evergreen scrub oak types, particularly where growth is open, or where it has been disturbed in the creation of roads or fields. Fire has doubtless long been the most important factor in creating or maintaining the openings Warea amplexifolia occupies. Logging and brushing increases it, and it will move into lands cleared and prepared for pine, persisting there in abundance until the crowns close.

References

- Channell, R.B. and C.W. James. 1964. Nomenclatural and taxonomic corrections in Warea (Cruciferae). *Rhodora* 46 (765):18-26.
- Shinners, L.H. 1962. Warea auriculata instead of W. amplexifolia of Small (Cruciferae). *Sida* 1:105-106.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 573-574. Chapel Hill, N.C.

SPECIES: #47 Warea amplexifolia (Nutt.) Nutt.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								?
No Lasting Effect		?	NA					
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Warea amplexifolia (Nutt.) Nutt.



CRASSULACEAE

Sedum pusillum Michx. Granite rock stonecrop;
Puck's-orpine

Technical Description

Annual smooth succulent herbs from flimsy, shallow, diffuse roots and winter rosettes.

Stems.--Shoots solitary or tufted, mostly 8 cm long or less spreading or erect, round in cross section, pale green, simple save in the inflorescence or sometimes with short, densely leafy lateral branches below, or much branched with numerous, upsweeping lateral branches.

Leaves.--Numerous, spirally arranged, the lowest gone by flowering time, all estipulate, all turgid (much thickened), 1 cm long, usually less, elliptic, spatulate, or obovate, greenish.

Flowers.--Symmetrical, about 5 mm broad in a simple cyme or a compound of cymes on slender but fleshy stalks 5 mm or less long. Sepals 4 (-5), forming a cup with the receptacle, the lobes broadly triangular, thinnish, entire, greenish, about 1 mm long. Petals 4 (-5), white with thin purplish lines or tints, oblong or ovate, 2.5-3.0 mm long, spreading in flower. Stamens 8 (-10), nearly as long as the petals, the anther very short, dark reddish-brown, the filaments lavender-pink-tinted, broadening and flattening toward their bases, spreading. Ovary superior, the carpels 4 (-5), in flower about 2 mm long, oblong, narrowing abruptly to short, slender, beaklike styles, erect in bloom, separate to near their bases, growing into spreading follicles up to 4 mm long.

Fruit.--Seeds numerous, broadly wedge-shaped, about 0.5 mm long, often greenish.

Distribution and Flowering Season

Granite outcrops, Piedmont and Blue Ridge, North Carolina southward and westward into Georgia. Flowering from March into May.

Special Identifying Features

Sedum pusillum is the smallest species of the genus in the southeast and differs from the others in its deltoid sepals. Superficially it is much more like Diamorpha, a small (2 species), closely related genus of the same outcrop areas, but Diamorpha has its carpel bases fused and its pinkish petals toward the apex tend to be somewhat pouched. The best way in the field to distinguish the two is by the color of foliage, that of Diamorpha forming patches strongly tinted with red or maroon, looking like patches of ships-rust on the granite, while leaves of the Sedum are green.

Habitats and Management Implication

This small species is usually found in full sun, becoming very abundant on the granite outcrops wherever there are shallow depressions large enough for water to pool and some thin substrate to wash in and accumulate. There it will be

found with other outcrop plants such as Lindernia monticola, Amphianthus pusillus, Diamorpha, Talinum etc. The granite outcrops range from small relatively low patches to considerable domes of hundreds of acres, and all are in the oak-hickory-yellow pine belt. The climax forest is mostly oak-hickory with pines occupying the thinnest mantles of soil first. As forest proceeds to occupy plants such as this one of the open granite are shaded out. Logging in such delicate systems as this is not recommended, nor is burning, but in either instance the result might well be to increase their area by reducing shade. The most significant threat to Sedum pusillum is through quarrying away of the granite, a process which has already eradicated the species over a part of its range.

References

Small, J. K. 1933. Manual of the southeastern flora, pp. 585-587. Chapel Hill, N.C.

SPECIES: #51 Sedum pusillum Michx. Pucks-orpine

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy								
Damage								X
No Lasting Effect	NA						NA	
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Sedum pusillum Michx.



EUPHORBIACEAE

Phyllanthus liebmannianus Muell. Arg. ssp. platylepis
(Small) Webster. Florida leaf-flower; leaf flower
Phyllanthus platylepis Small

Technical Description

Glabrous perennial herb, the rootstock blackish, slender, woody, horizontal or with ascending or erect branches from which come one or more slender, erect leafy shoots.

Stems.--Slender, to 3 dm long, terete, greenish or greenish-brown, simple or sparingly branched.

Leaves.--Numerous, spirally arranged, stipulate, the stipules triangular-ovate, reddish-brown, small; leaf blades narrowly obovate, obovate, or oblanceolate, 1-2 cm long, the apices rounded or obtuse, apiculate (with a small tooth or apiculus), the margins entire, slightly revolute, the base cuneate, sessile or short-petiolate, the upper surface darker green, the lower surface faintly reticulate with a raised midnerve.

Inflorescence.--The species monoecious with male and female flowers mixed in small umbel-like clusters at some upper nodes, single at others; flower stalks 2-3 mm. long in flower, slender, spreading, the female one elongating to 5 mm or more in fruit.

Flowers.--Staminate flowers with sepals 6, distinct, obovate or spatulate, rounded or obtuse, mostly entire, pale greenish-yellow, about 1-2 mm long; stamens 3, filaments 0.6-1.0 mm long, joined into a column by filaments at base; anthers about 0.4 mm long. Female flowers with calyx lobes 6, suborbicular or rhombic, acute, greenish, in fruit up to 2.8-3.5 mm long.

Fruit.--Capsules depressed-globose, about 4 mm broad. Seeds usually 3, ovoid, dark brown, minutely and irregularly ridged (verrucose).

Distribution and Flowering Season

Hardwood-palm hammocks, flatwoods, Gulf Hammock region on northwestern peninsular Florida. Flowering all year, but most heavily in springtime.

Special Identifying Features

This is the only species of Phyllanthus in the southeast that has a female calyx that becomes foliaceous in the fruit and which even in bloom is larger than that of the male flower. Its nearest relative, P. liebmannianus ssp. liebmannianus, is across the Gulf of Mexico in the Mexican Coastal Plain and in British Honduras.

Habitats and Management Implications

The species is one of high hydroperiod, fine textured, highly drained, sometimes alluvial soils derived from massive limestones of Tampa Formation. A typical habitat would be low hammock, forested by a mixture of tupelo, sweet-gum, pop-ash, cabbage palm, palmetto, magnolia where it forms clones of considerable

size in moderate to dense shade. Such forests are still extensive in the Gulf Hammock region on northwestern peninsular Florida from southern Taylor County south into Levy County. P. liebmannianus is also found in forest which has an admixture of slash pine-galberry-saw palmetto. Plants will persist in hammocks which have undergone either heavy logging or grazing, and are sometimes found in full sunlight; however, it is not known how long they will remain in such sites. It has been observed in low limerocky pasture along the highway east of Cedar Key, but is more abundant in contiguous areas of unlogged, ungrazed woodland. Fire is a rare factor in these low hammock areas so that there is no information on the response of this species to fire. A McDaniel specimen (S. McDaniel 4778) collected from 3 m. n.w. Steinhatchie in July 1964 is from a recently bulldozed area and from a good though local population, some evidence to the effect that the plants might seed into heavily mechanically disturbed sites. However, no specimens have ever been observed in contiguous drained areas.

References

Small, J. K. 1933. Manual of the southeastern flora, pp. 777-779. Chapel Hill, N.C.

Webster, G. L. 1970. A revision of Phyllanthus (Euphorbiaceae) in the continental United States. Brittonia 22: 44-76.

SPECIES: #54 Phyllanthus liebmannianus Muell. Arg. ssp. platylepis (Small)
Webster Leaf flower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		?	X	X				
Damage						X		
No Lasting Effect	NA							Poisonous
Beneficial if Done Properly					X			

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Phyllanthus liebmannianus Muell.-Arg.
ssp. platylepis (Small) Webster



FABACEAE

Baptisia simplicifolia Croom; coastal-plain wild indigo;
Scare-weed or Wild Indigo

Technical Description

Perennial legume from a knotty stout rootstock.

Stems.--One or few, smooth, stiffish, erect, to 1 meter tall, at base 7-10 mm thick, round but ribbed and cracking longitudinally, branching prolifically from near the base to form a bushy, leafy, broad crown, the branches somewhat zig-zag, tan or with reddish-brown tints.

Leaves.--Alternate, simple, lacking stipules, nearly sessile, leathery, smooth ovate, broadly elliptic or obovate, 5-10 cm long, obtuse but apiculate, entire and revolute, the bases broadly acute or broadly cuneate, the upper surface dark green, lustrous (leaves dry black), the lower surface much paler and finely reticulate.

Inflorescence.--Flowers produced in terminal, slender, spikelike racemes and on slender, stiffish, ascending stalks 3-4 mm long, each stalk subtended by a small, narrowly lanceolate bract.

Flowers.--Calyx broadly bell-shaped, smooth, about 5 mm long, the 5 lobes broadly or narrowly triangular, about as long as the calyx tube. Corolla clear yellow, 1.3-1.5 cm long, the standard blade about as broad as long or broader, erect, somewhat shorter than the wing and keel petals which project forward, the keel strongly curved upward. Stamens 10, all separate, smooth.

Fruit.--When young with cobwebby white hairs, becoming smooth and nearly black when ripe, on a stipe 4-5 mm long, the narrowly ovoid body about 10 mm long, with a persistent slender style beak fully as long or longer.

Distribution and Flowering Season

Sandy pinelands, northwestern Florida. Flowering late July, August.

Special Identifying Features

This and two other species, B. perfoliata and B. arachnifera are the only southeastern Wild Indigos which lack stipules and at the same time have simple leaves. B. arachnifera, similar in inflorescence has ovate foliage covered with cobwebby hairs; B. perfoliata has a broader, perfoliate leaf and produces its flowers singly in leaf axils. Neither of these overlaps the range of B. simplicifolia.

Habitats and Management Implication

This species is always associated with longleaf pine-deciduous scrub oak. It may be on sand ridges or in the drier flats, sometimes interspersed with saw palmetto, gallberry and a variety of heaths such as Vaccinium, Gaylussacia, Kalmia, and Lyonia. Of the grasses, wiregrass is its commonest associate.

The plants are not infrequent in sapling or larger sized plantations, seeming to seed in from adjacent natural stands. Site preparation involving clearcutting or prescribed burning tends to increase it, together with other relatively shade

intolerant forbs but as plantations form dense crowns closure this Baptisia is not found. Common mechanical methods of preparation involving discing, raking, chopping, etc. eliminate this plant. Optimal habitats are recently burned pineland savanna, where, in Leon, Liberty and Gadsden counties, the species is locally abundant.

References

Lairsey, Mary M. 1940. A monograph of the genus Baptisia. Ann. Mo. Bot. Gard. 27: 119-224.

Small, J. K. 1933. Manual of the southeastern flora, pp. 674-678.

SPECIES: #56 Baptisia simplicifolia Croon. Scare-weed or Wild indigo

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Baptisia simplicifolia Croom



ASTERACEAE

Hartwrightia floridana A. Gray ex S. Watson. Florida
hartwrightia, N.C.N.

Technical Description

Aromatic perennial herb from a stout ascending rhizome or erect caudex.

Stems.--Solitary or few, erect, branching only in the inflorescence, purplish below, greenish toward middle and above, dotted with glistening small glands.

Leaves.--Both in rosettes (from overwintering offshoots) and on the stem, the rosette and lower ones largest, the blades oblong, linear-elliptic, to elliptic or oblanceolate, 8-25 cm long, 1-5 cm broad on slender petioles from 1/3 as long to nearly as long, the apices narrowed but rounded, the margins entire, the bases cuneate or attenuate, both surfaces dull green, glabrous, gland-dotted. Stem leaves gradually diminishing upward, alternate, ascending, becoming sessile, linear, grading into scattered inflorescence bracts.

Inflorescence.--A compound, convex cyme of cymules, the branches arching upward candelabra like, slender but stiff, elongate. Heads several to numerous per cymule, on glandular peduncles from longer than to about as long as the heads. Flowering heads with involucre campanulate, about 4-5 mm high or, with flowers, 7-8 mm high and about 1 cm across. Receptacle naked. Bracts of involucre in nearly 1 series, with a few shorter ones outside, the longest oblong, blunt, entire, greenish, gland-dotted, slightly spreading.

Flowers.--All discoid, the corollas narrowly bell shaped from a short tube, about 3 mm. high, the slightly spreading lobes triangular, the surface gland-dotted, pale lavender to white or pink. Pappus a crown of short, narrow bristles or absent.

Fruit.--Akenes oblong or narrowly obovoid, 3-4 mm long, sharply few-ribbed with the intervals concave, gland-dotted.

Distribution and Flowering Season

Sandy peat, peat or peat muck of low clearings in pine flatwoods, pineland swamps, or bogs, southeastern Georgia southward to southern peninsular Florida. Flowering October through November.

Special Identifying Features

This species is monotypic, superficially resembling some Eupatoriums, but different in pappus and akene character, in aromatic character, as well as in leaf. As Small (1933) commented, the foliage in general appearance most resembles that of the sea lavender Limonium.

Habitats and Management Implication

This species is always on wet, peat-enriched, usually sphagnum substrates, mostly in full sunlight or light shade. A typical habitat would be set in slash pine (or longleaf)-saw palmetto-gallberry-titi. Common associated herbs would be those of bogs, thus mostly grass-sedge, with an admixture of eriocauls, xyrids,

bog orchids, pitcher plants (particularly S. minor), various fall flowering composites. It will often be amongst shrubby competition made up of gallberry (both species), Myrica, Magnolia, Persea, Cyrilla and various shrubby heaths, particularly Vaccinium, Lyonia.

Its range is diminishing in that habitat is lost through systematic drainage and conversion to pine plantation or to improved pasture. I have seen none where cattle are admitted, though it may be abundant just on the other side of a pasture fence. Logging of the overstory pine, including clearcutting, would favor the species. Of the various site preparations, dozing, root raking, chopping would eliminate it; bedding would have the least effect until such time as the pine crowns close. The species is probably maintained naturally through periodic fires which would remove competing shrub and grass.

References

Gray, A. 1898. Proceedings Amerc. Acad. Sci. 23 (Florula): 265.

Small, J. K. 1933. Manual of the southeastern flora, p.1318. Chapel Hill, N.C.

SPECIES: #68 Hartwrightia floridana A. Gray ex S. Watson. N.C.N.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Hartwrightia floridana Gray ex Wats.



ASTERACEAE

Helianthus eggertii Small. Sunflower

Technical Description

Tall (to 2.5 meters) perennial from a short, thick caudex, perennating by shallow elongate, fleshy rhizomes, the whole plant smoothish except for some slight roughening of the upper leaf surfaces.

Stems.--Erect, terete, usually purplish or reddish at least above the middle, stiffish but slender (at base hardly thicker than 1 cm), solitary or few, rarely branched save above the middle.

Leaves.--Mostly ovate to broadly lanceolate, the largest 10-20 cm long, alternate or opposite (above) the lowermost gone by flowering time, the longest at about mid-stem, the apices narrowly acute or acuminate, the margins entire, undulate or distantly and coarsely low-toothed, somewhat revolute, the bases from rounded to narrowly or broadly cuneate or acute, the petioles 5 mm long or less, the upper surfaces smoothish or sparsely scabrid, the lower surfaces glaucous. Stem leaves progressively reduced in size above middle into the inflorescence.

Inflorescence.--Compound, of few to several elongate upwardly arching branches, these with a scattering of distant, opposite leaves and terminating in one to few heads. Heads with slightly elevated chaffy receptacles, mostly 2.0-2.5 cm across the involucre and 1.5 cm from base to apex of involucre; phyllaries (bracts) narrowly lanceolate or lance-linear, loosely spreading or spreading-ascending in several series, the outermost shortest the mid and inner ones mostly 1.0-1.5 cm. long, narrowly acuminate, ciliate, greenish.

Flowers.--Ray florets about 10, the blades sterile, oblong, about 3 cm long, a rich yellow (the whole head in bloom ca. 6-8 cm broad). Disc florets slightly longer than the acute or short acuminate, ciliate chaff, the corollas ca. 5 mm long, with a short narrow tube and a narrowly campanulate throat producing 5 slightly spreading-triangular lobes. Pappus of 2-3 lanceolate or subulate deciduous ciliate or fimbriate scales.

Fruit.--Akene narrowly obovoid, prismatic, 3-4-angled, ca. 4-5 mm long, smooth, deep brown.

Distribution and Flowering Season

Sands, sandy-clays, cherts, and gravels of open upland woods, middle Kentucky southward into northwestern Alabama. Flowering August through September.

Special Identifying Features

This species has habit, stem and foliage much like H. glaucophyllus, an Appalachian species from eastern Tennessee and western North Carolina, but its heads are larger and its foliage somewhat harsher. It resembles also H. laevigatus, but has thicker rhizomes and larger heads. There appear to be no close relatives to it within its somewhat narrow range.

Habitats and Management Implication

A typical habitat would be open oak-hickory upland woods, usually in small natural or artificial clearings or underneath open stands. It is always on well drained soils, these usually gravelly with a high silicon content from weathered chert, and usually rather low in moisture. Its late summer herbaceous associates are other sunflowers such as H. microcephalus, H. mollis, H. augustifolius, H. atrorubens, Erigeron canadense, Liatris spp., several species of goldenrod, aster, etc., Lechea, many Lespedeza and Desmodium. Understory woody plants consist of Smilax, Rubus, Vaccinium (both high and low bush). As mentioned above, the overstory when present is usually a mixture of several species of upland oak and hickory, with an admixture of Nyssa, Diospyros, Ulmus alata, Oxydendron, Cornus. The plants are most likely to be found in the Western Highland Rim of middle Tennessee, an area which once was much given to cotton culture or to unfenced pasture in the past but much of which subsequently was allowed to go back to ungrazed forest of a low quality. Much fire used to occur in even the recent past, fire which maintained a savanna aspect in large areas. Subsequent protection from fire has doubtless reduced the area of this and several other species of herbs in that heavy resultant stands of oaks have sparse herbaceous cover beneath, or go over to much braken fern and Vaccinium.

Thus prescribed burn would (if timed properly) increase this species. Most site preparation methods would not effect H. eggertii adversely providing contiguous areas of seed source were left undisturbed. Cutting or thinning of overstory would increase this species by admitting light and reducing competition. A closed hardwood canopy would shade it out. Grazing eliminates the species.

References

- Small, J. K. 1933. Manual of the southeastern Flora, p. 1437. Chapel Hill, N.C.
- Heiser, C. B. 1969. The north American sunflowers (Helianthus),
Mem. Torr. Bot. Club 22 (3): 1-218.
- Beatley, J. C. 1963. The sunflowers (genus Helianthus) in Tennessee
Jour. Tenn. Acad. Sci. 38: 135-154.

SPECIES: #69 Helianthus eggertii Small Sunflower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect	X							
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Helianthus eggertii Small



ASTERACEAE

Heterotheca flexuosa (Nash) Harms. Bent golden-aster; N.C.N.
Chrysopsis flexuosa Nash

Technical Description

Perennial herb, several shoots 30-50 cm long arising from a tuft of short-linear overwintering leaves, most of these primary shoots spreading outward briefly, then arching upward (decumbent).

Stems.--Rounded, the lower part purplish or reddish, the upper part greenish, somewhat zig-zag, slender but stiffish, the surfaces mostly with appressed, long, weak, whitish hairs. Primary shoots usually branched from all or most of the upper and middle (sometimes even lower) nodes, these branches arching upward also, thus the entire plant often quite full.

Leaves.--Alternate, numerous, linear, oblong lanceolate, or oblanceolate, the longest mostly 5-8 cm long, mostly under 1 cm. broad, spreading or ascending, the lowermost scalelike, the lower leaves often dried and gone by flowering time, the longest lowest, then progressively shorter into the inflorescence, grading finally into the bracteal leaves of the long peduncles, these short linear and under 1 cm. long.

Inflorescence.--Heads several to numerous, each one erect on slender, elongate, cobwebby-hairy peduncle, involucre about 1 cm high and less than 1 cm broad, the phyllaries (bracts) numerous, linear, in several loosely overlapping series, the outermost smallest, short-linear, the longest nearly 1 cm long, pale green with scarious margins, the apex slenderly acuminate, the surfaces eglandular or with sparse, long, mostly appressed hairs. Surface of receptacle smooth.

Flowers.--Ray flowers sterile, about 10, the ligules bright yellow, spreading, linear, 8-10 mm long. Disc florets numerous, their corollas yellow, narrowly tubular with erect, short-triangular lobes; pappus 5-7 mm long of several capillary antrorsely (upwardly) barbellate bristles.

Fruit.--Akene narrowly cylindrical, about 3 mm long, appressed-hairy.

Distribution and Flowering Season

Sandy clearings, mostly in pinelands, northwest Florida, flowering in September and October.

Special Identifying Features

This localized species is in the section Pityopsis of a genus whose limits are still argued by taxonomists. Most of the Pityopsis are species with linear, silvery or pale pubescent, monocot-like, leaves. In size character of the flowering head, this species is closest to H. graminifolia, a common species in pinelands through most of the southeast; however H. flexuosa has shorter, sometimes falcate, rather than straight, leaves, a lower habit and zig-zag stems. Indeed, it superficially is most like Heterotheca falcata (Pursh) Harms, a plant of similar habitat in coastal situations from Mass. south into New Jersey, differing from that species in minor (though consistent) characters such as pubescence, head size, akene.

Habitats and Management Implication

H. flexuosa is always found on deep sands near the present coast, usually in sandy clearings amongst sand pine, slash pine and/or longleaf pine, there sometimes in considerable abundance. It may often be associated with several other species of Heterotheca, and other herbs of such dry sandy sites such as Polygonella, Liatris chapmanii, L. provincialis, Petalostemon caroliniense, Bulbostylis, various Panicum (sect. Dichanthelium) and Andropogon. It is frequently amongst shrubs such as Conradina, Clinopodium, Myrica, and various shrub oaks, particularly Q. myrtifolia, Q. chapmanii, Q. minima.

This is a plant of full sunlight or at most, light shade. Removal of enroaching overstory will encourage its spread. It will seed into areas within its range where site preparation involving complete removal of all cover has taken place. Prescribed burning would have an effect difficult to measure here in that this is a species of open, sandy sites where such burning is not really applicable. Natural fires have doubtless in the past been beneficial to this species in removing some competing shrubby and overstory woody vegetation.

References

Bowers, Frank D. Unpublished Thesis on Heterotheca - Pityopsis sect. University Tennessee, Knoxville.

Dress, W. J. 1953. A revision of the genus Chrysopsis in eastern North America. (Unpublished Ph.D. thesis at Cornell)

_____. 1954. Two new Floridean species of Chrysopsis Ell. (Compositae). Gentes Herbarium 8:404-409.

Harms, Vernon L. 1969. A preliminary conspectus of Heterotheca sect. Pityopsis (Compositae). Castanea 34: 402-409.

_____. 1974. A preliminary conspectus of Heterotheca sect. chrysopsis. Castanea 39: 155-165.

SPECIES: #70 Heterotheca flexuosa (Nash) Harms. N.C.N.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy				X			X	
Damage		X	X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Heterotheca flexuosa (Nash) Harms



ASTERACEAE

Verbesina chapmanii J.R. Coleman. Chapman's crownbeard;
crownbeard

Technical Description

Robust, bushy perennial from a thick, knotty caudex with fleshy roots.

Stems.--Usually numerous, stiff, erect or ascending, simple or sparingly branched, round but many-ribbed, minutely roughened.

Leaves.--Erect, opposite or nearly so, sessile or nearly so, firm, lanceolate to oblong, elliptic or rarely oblanceolate, the largest from 6-10 cm long, 1.5-2.5 cm broad, the tips rounded to blunt-acute, the margins low-serrate to entire, the bases acute, cuneate or rounded, the surfaces scabrous. Lowest leaves smallest, mostly oblanceolate or spatulate, the pairs well separated, grading up the stem to the largest at mid-stem, then smaller into the inflorescence.

Inflorescence.--Heads solitary at tips of long peduncles, or few and stalked in a terminal cyme or, rarely, the plant also producing long-stalked cymes from upper leaf axils and the inflorescence fuller. Heads short-conic, 1.5-2.0 cm broad across the base, the bracts numerous, imbricated in 2-3 series, the largest about 7 mm long, oblong or narrowly elliptic or oblanceolate, acute or short-acuminate, entire, the backs many-ribbed, scabrous, greenish or (more often) maroon-tinted. Phyllaries grading into reddish-brown chaff of about the same length but narrower tipped, each chaff-scale embracing a floret.

Flowers.--All discoid, numerous, the corollas about 7 mm long, yellow with narrow tubular bases and narrowly campanulate limbs, the lobes triangular and erect, the surfaces scattered-puberulent.

Fruit.--Akene somewhat flattened so that one edge fits into the fold of subtending chaff, to 7 or 8 mm long, oblong or narrowly obovate, the greenish seed cavity with strong, broad lateral wings, the apex truncate and lacking pappus.

Distribution and Flowering Season

Moist pine flatwoods savannas, northwest Florida. Flowering in June, July and intermittently through summer.

Habitats and Management Implication

This species is confined to high hydroperiod, black, sandy-peaty, savanna soils, usually in open stands of slash or longleaf pine, grass-sedge formations where wiregrass often dominates, and at the edges of boggy sites. It is most abundant where there have been recent fires sufficient to remove competition from the shrub (particularly palmetto and gallberry) understory and the more vigorous grasses (particularly Aristida). Areas within its former range that have been drained, row-planted to slash pine, and protected from fire are without this species.

References

Chapman, A. W. 1860 Flora of the southern U.S. P. 255. Cambridge, Mass.

Coleman, James R. 1972 Nomenclatural Clarification of two species of Verbesina (Compositae) endemic to Florida. Rhodora 74 (797): 97-101.

Small, J. K. 1933. Manual of the Southeastern Flora. pp. 1443-1444. Chapel Hill, N.C.

SPECIES: #72 Verbesina chapmanii J. R. Coleman, Crownbeard

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Verbesina chapmanii J.R. Coleman



1951

1952

1953

ASTERACEAE

Verbesina heterophylla (Chapm.) A. Gray. Variable-leave
crownbeard; crownbeard
Actinomeris heterophylla Chapm.
Verbesina warei A. Gray

Distribution and Flowering Season

V. heterophylla is in similar habitats to V. chapmanii (which see!) but is confined to the flatwoods of eastern peninsular Florida and usually on somewhat drier sites. It also flowers mostly in early summer.

Special Identifying Features

Similar to V. chapmanii in rootstock and habit, differing in the following ways: Stems more scabrous, strongly winged between nodes. Leaves sessile, often decurrent (blade margins merging with stem wings), mostly broadly elliptic or obovate, the tips acute to rounded, the margins coarsely serrate or dentate, the bases cuneate, the surfaces very harsh. Heads more numerous, usually single on numerous, upwardly arching, elongate stiffish stalks, narrower, between 1 and 1.5 cm broad, the phyllaries (bracts) narrower-tipped, acuminate. Ray florets present, spreading, yellowish. Akene shorter, ca. 5 mm long, with a broader outline.

Habitats and Management Implication

The plants are to be looked for on sandy peat in fire-maintained savannas or in open stands of slash pine-palmetto where wiregrass dominates. Problems in management would be essentially the same as those for V. Chapmanii, (which see).

References

- Chapman, A. W. 1860. Flora of the Southern U. S. pp. 255.
- Coleman, J. R. 1972. Nomenclatural clarification of two species of Verbesina (Compositae) endemic to Florida. Rhodora 74 (797):97-101.
- Small, J. K. 1933. Manual of the southeastern flora, Pp.1443-1444. Chapel Hill, N.C.

SPECIES: #73 Verbesina heterophylla (Chapm.) A. Gray, Crownbeard

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	X
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Verbesina heterophylla Chapm. ex Gray



ERICACEAE

Rhododendron austrinum (Small) Rehder. Florida azalea; Azalea
Azalea austrina Small

Technical Description

Deciduous shrub, mostly 2-3 meters tall, producing 1-several slender shoots from a shallow but strong root system.

Stems.--Bark of older stems grayish, thin, loosening, that of new shoots reddish brown, puberulent, becoming smoothish. Primary shoots rebranching just below the terminal bud, this rebranching appearing whorled so that oldest shoots develop several sets of "whorls", the appearance of the whole shrub being a broad spreading compound of branch crowns.

Leaves.--Alternate, rather close-set on the numerous new shoots, these unfolding mostly after flowering time. Leaf blades spreading to ascending on short stalks, (these hairy with a mixture of short pale hairs and longer, gland-tipped hairs,) narrowly obovate to oblanceolate, elliptic or oblong, mostly 5-8 cm long, acute and with a short mucro, entire and ciliate, the bases attenuate or cuneate, the upper surface dark yellow green, at first puberulent, later smoothish, the lower surface paler, persistently pilose, at least along the mid-nerve.

Inflorescence.--Flowers arising from ovoid, largish, imbricate terminal buds fully 1 cm long, the scales of which are covered on the backs with white, appressed hairs. Inflorescence a short, compact raceme of spreading flowers, the pedicels slender, puberulent and glandular-hairy, up to 1 cm long.

Flowers.--Corollas mostly salverform, between 3 and 4 cm long, the tube bearing a mixture of white, fine but bristly hairs mixed with a few stalked glandular hairs, the corolla lobes unequal, elliptic to broadly or narrowly triangular, the whole corolla ranging in the species from yellow through all shades of red, very rarely roseate (then probably a hybrid with R. canescens). Flowering calyx cup-shaped, with 5 slightly spreading-triangular, white-hairy and glandular lobes. Filaments elongate, projecting forward then curving upward well beyond the corolla tip, somewhat reddish. Ovary lance ovoid, ca. 4 mm long, densely white-appressed-hairy; style elongated beyond the stamens, curved upward.

Fruit.--Capsules oblong, 1 cm long, or straight or somewhat curved, brownish, puberulent with a mixture of stalked glands.

Distribution and Flowering Season

Rhododendron austrinum, which blooms from February through April, is found in ravines and bottoms from northwest Florida northward and westward into southwestern Georgia, southern Alabama and southeastern Mississippi.

Special Identifying Features

R. austrinum resembles the flame azalea, R. calendulaceum (Michx.) Torr. the closest, but that species has leaves falling as the flowers reach full bloom.

Habitats and Management Implication

This species is found in moist acidic sandy soils, primarily in shadey ravines and bottoms, never where the shallow roots would be flooded over long periods.

Thus in large bottoms it is generally either on rises of sandy alluvium or on the older terraces. Generally the overstory is of willow-oaks, southern sugar maples, beech, Magnolia grandiflora, M. virginiana, lowland hickory. Common associated understory woody plants are such as Rhododendron canescens (with which this hybridizes), Symplocos, Sebastiania, Illicium, Vaccinium arborescens, other high-bush Vaccinium, particularly V. elliotii. Fairly high intensity logging of the lowlands R. austrinum frequents, so long as some overstory remains, does not seem to affect it adversely. Clear-cutting of such stands is usually accompanied by, if forest is developed, planting of slash pine, to the detriment of this shrub. More often, this sort of bottom, if broad, is converted either to pasture, which reduces its numbers, or to some type of row crop culture, which eliminates it.

These plants are so showy that they are subjected to much cutting and uprooting of whole shrubs. Occasionally the species is seen in cultivation as a result usually of moving the shrubs; more often such transplants lead to failure.

Duncan, W. and Puller, T. K. 1962. Lepidote Rhododendron of the Southeastern U.S. Brittonia 14: 290-298.

Kral, R. 1973. Some notes on the flora of the southeast...Rhodora 75:366-410.

Small, J. K. 1933. Manual of the Southeastern Flora, p. 995. Chapel Hill, N.C.

Wilson, E. H. and A. Rehder. 1921. A monograph of Azalea. P. 219. Univ. Press, Cambridge, Mass.

SPECIES: #75 Rhododendron austrinum (Small) Rehder. Azalea

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage	X		X			X		X
No Lasting Effect								
Beneficial if Done Properly					X			

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Rhododendron austrinum (Small) Rehder



FABACEAE

Rhynchosia cinerea Nash. Brown-haired snout bean; N.C.N.

Technical Description

Perennial prostrate (non-climbing) vine.

Stems.--Several shoots forming from a woody taproot, these rebranching to form sprawling slender viney shoots from 1 to several meters in length. Stems slender, somewhat rib-angled, greenish-brown, puberulent with downwardly - directed whitish hairs particularly along the ribs, frequently branching toward the main stem base.

Leaves.--Alternate, fairly well separated, spreading, stipulate with stipules erect, early deciduous, narrowly triangular, scaly, puberulent; petioles mostly 1.5-2.0 cm long, puberulent, spreading (sometimes arising in pairs, and opposite, from a short stalk); leaflets mostly 3, ovate to round or broader than long, 1-3 cm long, firm, the terminal one largest, the apex obtuse, rounded, sometimes short-mucronate, the margins entire, somewhat revolute, the bases rounded or low-cordate, the surfaces dark yellow-green, reticulate, the upper surface finely appressed-hairy, the lower surface short hairy mostly on the veins.

Inflorescence.--Flowers 1-7, usually in short racemes on slender, short-hairy, ascending stalks to 10 mm long from axils of most median and upper leaves, and shorter than the subtending leaf.

Flowers.--Calyx about 1 cm long, slightly longer than the corolla, the 5 lineal, puberulent, ascending, tapering-tipped lobes unequal, much longer than the short, campanulate tube. Corolla yellow, the standard short-clawed, nearly round, retuse, slightly arched upward, but folded over the slightly shorter wings and the keel petals. Ovary narrow, densely short-hairy, the style elongate, bent.

Fruit.--Asymmetrically oblong, few-seeded, compressed, 1.5-2.0 cm long, the upper valve edge straight, the lower strongly curved into the acuminate, slender tipped beak; seeds nearly round, flattened, about 3 mm broad, dark brown.

Distribution and Flowering Season

Sandy uplands and pinelands, peninsular Florida southward into the Florida Keys. Flowering from June into autumn.

Special Identifying Features

This plant, while a vine, never twines and thus is not a climber. It is distinguished from other species which are trifoliolate and prostrate-viney, by its cinereous hairs, the more oblong fruit, and the more or less lateral position of the fruit beak. Its nearest relative, R. difformis, a climber, has larger leaflets.

Habitats and Management Implication

R. cinerea is found in a variety of associations. It may be on low sandy rises in flatwoods of slash or longleaf pine with palmetto and gallberry, here on sandy clearings. It may be in sandy fields adjacent to high hammocks of true live oak,

or in clearings in such hammocks. Or it may be in the longleaf pine-turkey oak sandhills, again in clearings. Finally it may be in clearings in sand pine-evergreen scrub on ancient dunes. In any event it is on dryish, at least well-drained sands, and is always either in full sun or light shade. As is true of other leguminous plants of such situations, it increases and maintains through periodic fire. Clearing of forest increases it through reducing shade or producing openings. It is threatened mostly through housing developments, development of orange groves or improved pastures over much of its former range.

References

Nash, G. V. 1895. Notes on some Florida plants. Bull. Torr. Bot. Club 22: 141-161.

Small, J. K. 1933. Manual of the southeastern flora, pp. 713-715. Chapel Hill, N.C.

Walraven, W. C. 1970. A statistical analysis of sixteen taxa of Rhynchosia (Leguminosae) in the United States. Brittonia 22(10): 85-92.

Vail, Anna M. 1899. Notes on the genus Dolicholus (Rhynchosia) in the U.S. Bull. Torr. Bot. Club 26: 106-117.

SPECIES: #76 *Rhynchosia cinerea* Nash. N.C.N.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage		X	X	X				X
No Lasting Effect				(NA)				
Beneficial if Done Properly	X							

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Rhynchesia cinerea Nash



FABACEAE

Tephrosia mohrii (Rydb.) Godfrey. Pineland hoary-pea;
Hoary peas
Cracca mohrii Rydb.

Technical Description

Perennial herbs from deep branched taproot systems, these producing (usually) several spreading and branched underground shoots from which arise a number of spreading to erect leafy flowering shoots.

Stems.--Flowering shoots slender but stiffish, simple or sparingly branched toward the base, ribbed, at most to 3 dm. mostly 2 dm or less long, greenish or reddish tinted, appressed-hairy with erect, pale shortish hairs.

Leaves.--Alternate, 1-pinnate, spreading or ascending, the appressed hairy, lance-linear stipules 3-5 mm long, early falling; rachis slender, tan, appressed-hairy, the petiole shorter than the longer leaflets; leaflets mostly 15-20 pairs or more, on short stalks (ca. 2 mm), elliptic or oblong, firm, mostly 1-2 cm long, rounded, obtuse, acute or emarginate, usually with a short mucro, the margins entire, the bases acute, the upper surface dark yellow green and veiny, hairy with short, appressed, stiffish hairs, the lower surface paler.

Inflorescence.--Flowers 1-2 axil in congested to somewhat loose, ovoid or short-cylindrical racemes, these leafy-bracted at least toward the bases, exceeded by the leaves, terminal but on slender, ascending appressed-puberulent axes.

Flowers.--Calyx 5-toothed, appressed-pubescent, somewhat bilabiate, ca. 5 mm long, the lobes broadly triangular-based, slenderly acuminate, longer than the tube. Corolla about 1.5-2.0 cm long, showy, the standard petal longest, short-clawed, its blade broadly obovate to suborbicular, somewhat emarginate, pale yellowish-green or cream, the wings short-clawed, oblong, round-tipped, auricled on the upper side, lavender-rose, the keel strongly bowed, yellowish-white with tints of lavender rose. Stamens 10, in 2 lengths, the filaments fused for more than 1/2 the length, the anthers all alike, short.

Fruit.--linear-oblong, strongly flattened, mostly 4-5 cm long, with a narrow beak laterally at the tip and splitting along both edges, the surface appressed-hairy, the seeds numerous, round, somewhat flattened, dark brown.

Distribution and Flowering Season

Longleaf pine-turkey oak sandridges, southern Georgia westward into southern Alabama and southward through northwestern Florida. Flowering from April into early June.

Special Identifying Features

Godfrey (1958) differs considerably from the last revisor of North American Tephrosia, (Wood 1949), in thinking that this is a species distinct from T. virginiana (L.) Pers. It does differ from most T. virginiana in being a shorter plant with shorter leaves, in its inflorescence being exceeded by the bracteal leaves, in its smaller flowers. Whatever T. mohrii really is, it is a rather uniform entity with a fairly continuous range.

Habitats and Management Implication

T. mohrii is confined to the longleaf pine-turkey oak sandhills and flats, usually in some of the driest sites, and often locally abundant. Clear cutting has little effect upon it, unless it would be to increase abundance. It will as readily seed into areas where logging has been followed by bulldozing, raking, etc. as it does into disturbed highway shoulders and rights of way. In nature it probably maintained through being part of fire disclimax in the longleaf pine belt.

References

- Godfrey, R. K. and R. Kral. 1958. Observations on the Florida flora. *Brittonia* 10: 166-177.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 704-708. Chapel Hill, N.C.
- Wood, C. E. 1949. The American barbistyled species of Tephrosia (Leguminosae). *Rhodora* 51 (609, 610, 611, 612.).

SPECIES: #77 Tephrosia mohrii (Rydb.) Godfrey. Hoary peas

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							eventually X (eventually)	
Damage								X
No Lasting Effect		X	X	X				
Beneficial if Done Properly	X				X	X		

Other Comments: If adjacent seed source

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Tephrosia mohrii (Rydb.) Godfrey



FABACEAE

Quercus georgiana M. A. Curtis. Georgia ak or Stone
Mountain ak

Technical Description

Tall shrub or small tree, rarely to 12 meters tall.

Stems.--The trunks 1 or several, with diameter rarely reaching 20 cm, the bark gray-brown, smoothish, in age developing shallow longitudinal cracks and cross broken into thin plates, the branches spreading, smoothish. Twigs slender but stiffish, smooth, reddish-brown, the winter buds, with larger terminals lance-ovoid, ca. 4 mm long, round in cross-section, narrowly acute, the scales lustrous reddish-brown, smooth save for low-ciliate margins.

Leaves.--Obovate to oblanceolate or elliptic, the blades 5-10 (-15) cm long on smoothish petioles 5-10 mm. long, mostly 3-5-lobed, the lateral lobes spreading-ascending, oblong or triangular, prickle-tipped, and themselves otherwise entire or with 1-few low, prickle-tipped teeth, the sinuses broad and rather shallow, the terminal lobe usually broadest and longest, simple or low-toothed apically, the base cuneate, the upper surface dark yellow-green, lustrous, the lower surface paler, smooth save for tufts of dully yellow cottony hairs in the vein axils.

Fruit.--Ripening in 2 years, sessile on short, stiffish spreading peduncles; acorn nearly 1 cm long, broadly ovoid to round, dull brown and faintly striped; acorn cup shallowly turbinate, covering the nut about 1/2 its length or less, 7-8 mm high, 12-13 mm broad, 10-11 mm across the apex, the scales small, tightly appressed, narrow the pale reddish-brown, sparsely short-hairy and ciliate, the tips truncated, those of the rim with tips erect.

Distribution and Flowering Season

On and around granite outcrops, primarily in the Piedmont, from South Carolina across Georgia into east-central Alabama.

Habitat and Management Implication

This rather rare tree is a prolific mast producer similar in that respect to Q. ilicifolia. In bark and twig, particularly bud, it is like Q. phellos or Q. palustris; in leaf it is like shallow-lobed extremes of Q. palustris (which has broad, rather than cuneate leaf bases!). It may be abundant locally within its rather small range. If not actually found on granite outcrops it will be on sandy soils close to them, usually in association with other oaks such as Q. margaretta (mostly the low, running variety), Q. stellata, Q. velutina, Q. marilandica, Q. falcata, Q. prinus, etc., upland hickories, sourwood, sassafras, with an understory mostly of heaths such as Vaccinium, Kalmia, Rhododendron (primarily R. canescens or other deciduous rhododendrons). Pines may also be in the overstory or even dominating, these mainly P. echinata, P. palustris, P. taeda.

The sites this oak occupies are usually of a poor quality. Cutting of suitable pine and hardwood would tend to increase this species. All oaks, including this one, sprout prolifically from the stump on cutting or burning. Thus it would increase as a result of clear-cutting, or fire. However, the rocky sites and thin soils occupied by this species are not favorable to such practice, nor are they favorable to most site preparation methods, including controlled burning.

References

- Radford A. E. et al. 1968. Manual of the vascular flora of the Carolinas, pp. 372-385. Chapel Hill, N.C.
- Sargent, C. S. 1949. Manual of the trees of North America, Vol. I, pp. 249-250. Dover Press.

SPECIES: #78 Quercus georgiana M. A. Curtis Georgia oak or Stone Mountain

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy								
Damage								X
No Lasting Effect	NA						NA	
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Quercus georgiana M.A. Curtis



FAGACEAE

Quercus shumardii Buckley var. acrifolia Palmer oak;
maple leaf Shumard's oak

Technical Description

In bark and habit comparable to Q. shumardii.

Stems.--Twigs slender but stiffish, grayish-brown, smooth; winter buds narrowly ovoid, 4-5 mm. long, acute, the scales dull gray-red-brown, smooth with very thin, broad margins.

Leaves.--On slender, spreading, smooth petioles 3-4 cm long, the blades broadly ovate to round or even reniform, in the central form mainly with 5 principal lobes, these spreading palmately as in some hard maples, but the venation truly pinnate, the lobes mostly narrowly or broadly cuneate or obovate, basally entire, toothed or shallowly triangularly lobed apically, all teeth and lobes prickletipped, the sinuses between the main lobes deep, tending to be closed, the blade base obliquely truncate or cordate, the upper surface dark green, lustrous, the lower surface paler, with tufts of pale cottony hairs in the vein axils. Fruit as in Q. shumardii, nearly sessile, 2-3 cm long, the cup shallow, 1.5-2.0 cm across, covering less than 1/3 of the nut, the numerous small ovate scales tightly appressed, round-tipped, the backs dull gray-brown with a close covering of small, weak, flattish hairs, the margins broad, thin, brown, smooth, ciliate.

Fruit.--Acorn ovoid, ellipsoidal, or nearly round, pale gray-brown with a dusting of flat, pale, stellate or simple hairs.

Distribution and Flowering Season

This tree, thus far, has been found only on Magazine Mountain, Logan County, Arkansas. This puts it in the Ouachita system. The specimens are medium sized, are toward the rocky rim, at elevations of about 2500 ft., and are mixed with a variety of upland oaks and hickories. The only known locality is in the Ozark National Forest.

Special Identifying Features

While this is but a variety, and probably has silvical character comparable to that of the rest of the species, it is so unusual as to bear preservation and, hopefully, propagation as well. As the name and description indicate, the leaves are suprisingly maple-like, in size and outline very comparable to Acer grandidentatum.

Reference

Palmer, E. J. 1927. Journ. Arnold Arb. 8:54.

SPECIES: #79 Quercus shumardii Buckley var. acrifolia Palmer; oak

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy								
Damage								X
No Lasting Effect	NA						NA	
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

HALORAGACEAE

Myriophyllum laxum Shuttlw. ex. Chapm.; Piedmont water-
milfoil; water-milfoil

Technical Description

Perennial aquatics from submersed, creeping and rooting bases.

Stems.--The leafy shoots very elongate, slender, terete, smooth, greenish with tints of red.

Leaves.--The submersed leaves mostly in whorls of 3 or 4, spreading, 2-3 cm long pinnately divided into spreading, hairlike segments, green or with tints of red; emergent parts of stems terminal, erect. The emergent leaves abruptly shorter, (at most to 5 mm. long), more shallowly pinnate with broader segments or even entire, oblanceolate.

Inflorescence.--Flowers unisexual or bisexual, where unisexual, with the male borne above, small, greenish or with some reddish tints, sessile in the whorls of emersed leaves, the inflorescence an evenly interrupted, slender spike.

Flowers.--Sepals and petals each 4, small, scale-like, the sepals about 0.5 mm long, the petals about 1 mm long. Stamens projecting beyond the perianth, 4-8, the filaments very slender, the anthers linear, yellowish green, about 1.5 mm long. Ovary inferior, the 4, short-oblong, united carpels with recurved styles and stigmas.

Fruit.--Ripe fruit separating into 4, 1-seeded, segments, the segment backs low-warty.

Distribution and Flowering Season

Ponds and ditches, Coastal Plain, eastern North Carolina southward through South Carolina, Georgia, northern Florida and west into northwestern Florida and southern Alabama. Flowering from April through August.

Habitats and Management Implication

These plants, while considered rare, may be locally abundant in clear water of ditches and shallow ponds. In that they may be in situations that may be dry one year, filled with water another, they are abundant only during wetter periods. The ecology of most aquatic groups such as this is poorly understood. Naturally, in areas where drainage of forest has lowered the water table and rendered standing water less available, such species as M. laxum become more rare. On the other hand they may also increase in areas where water is artificially impounded. Some myriophyllums such as M. brasiliense, M. heterophyllum, M. spicatum are frequently dominant aquatics in such impoundments. Such, however, does not seem to be the case with this species.

References

Radford, A. E. et al. 1968. Manual of the vascular flora of the Carolinas, p. 758. Chapel Hill, N.C.

Small, J. K. 1933. Manual of the southeastern flora, pp. 954-955. Chapel Hill, N.C.

SPECIES: #80 Myriophyllum laxum Shuttlw. ex. Chapm. Water-milfoil

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy								
Damage								
No Lasting Effect				NA				
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Myriophyllum laxum Shuttlw. ex Chapm.



HAMAMELIDACEAE

Fothergilla gardeni Murr. Dwarf-witch-alder

Technical Description

Shrubs 1 meter or less tall, simple or profusely branched from the base.

Stems.--Soboliferous, the erect or ascending primary shoots unbranched or with several ascending lateral branches. Shoots slender but stiffish, gray-brown or reddish-brown, the older growth smooth, the thin outer bark cracking longitudinally, the new shoot growth densely tomentose with stellate-edged scales.

Leaves.--Alternate, ascending, deciduous, estipulate, numerous on shoots and on frequent spur shoots, 2.5 - 5.0 cm long, obovate, oblong or broadly cuneate, rather firm, the apices truncate or broadly rounded, low-toothed, the margins at least toward the base entire or undulate, somewhat revolute, the base cuneate, somewhat oblique, the upper surface dark yellow-green, dull, stellate-puberulent, the lower surface paler, more densely stellate-hairy (at least when young), often stellate tomentose with blonde or reddish-brown hairs; petioles short, round, stellate hairy.

Inflorescence.--Flowers at shoot tips, sessile in pseudo-whorls, in rather compact oblong white spikes 3-5 cm long, the internodes elongating as fruit develop, each flower subtended by a short, ovate, tomentose bract.

Flowers.--Sepals fused with receptacle into a short (3-4 mm) campanulate, pale-tomentose hypanthium, the calyx lobes very reduced, forming a more or less scaly rim. Petals absent. Stamens numerous, the filaments club-shaped, ca. 5 mm long very white, slightly flattened, the anthers small, yellowish, reniform. Ovary half-inferior, densely tomentose, 2 carpellate, styles 2, filiform, later the carpel tips grading acuminately into 2, spreading, persistent beaks.

Fruit.--Capsule broadly ovoid, scurfy-hairy, nearly 1 cm long, woody, with 2, shiny brown, oblong seed to 5 mm long, all very similar to Hamamelis.

Distribution and Flowering Season

Pineland bog margins, pocosins, savannas, Coastal Plain from eastern North Carolina intermittently southward to north Florida, thence west into northwest Florida and southern Alabama. Flowering March into May.

Special Identifying Features

F. gardeni, mostly a Coastal Plain species, is a lower shrub with more pubescence, smaller, narrower based leaves, smaller flowers, shorter stamens, smaller fruit than the more interior and montane F. major (Sims.) Lodd.

Habitats and Management Implication

E. gardeni is a plant of acidic, highly humified sands that are permanently wet; a good place to look for it is in sparingly pine-forested pocosins and on the shrubby edges of pitcher plant bogs. It is usually a part of dense shrubbery, associated with Myrica, various Vaccinium and Gaylussacia, Persea, Magnolia virginiana, gallberries, etc. In the eastern parts of its range there is usually some pond pine mingled with longleaf pine in the overstory. It is

plainly part of a community in which fire was, and is, critical to its maintenance. It is a plant of full sunlight or very light shade, and probably increases with the reduction of competition through clear-cutting or burning. Any site preparation involving drainage, combined with bulldozing, rootraking, chopping, would eliminate the species, with bedding being the least undesirable.

References

Radford, A. E. et al. 1968. Manual of the vascular flora of the Carolina, pp. 530-531. Chapel Hill, N.C.

Small, J. K. 1933. Manual of the southeastern flora, p. 601. Chapel Hill, N.C.

Weaver, Richard E. 1969. Studies in the North American Genus Fothergilla (Hamamelidaceae). Jour. Arnold Arb. 50:599-619.

SPECIES: #81 Fothergilla gardeni Murr. Dwarf witch-alder

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X				
Damage No Lasting Effect			X				X	?
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Fothergilla gardeni Murr.



HYDROPHYLLACEAE

Phacelia dubia (L.) Trelease var. georgianna McVaugh.
Georgia small-slowered phacelia; Scorpionweed

Technical Description

Annual taprooted herbs.

Stems.--The stems solitary and erect or several and spreading-ascending, or erect with several candelabralike branches from near the base, mostly 10-20 (-30) cm long, slender but stiffish, terete, reddish-tinted with stiffish, sharp, short, white, upwardly-directed hairs flattened to the surface mixed with spreading stalked glands.

Leaves.--Basal leaves in a rosette, usually withering by flowering time, distinctly petiolate, odd pinnately compound, 2-4 cm long, with several pairs of leaflets spreading in an oblong pattern, the terminal and uppermost laterals largest, mostly elliptic or obovate, themselves sometimes deeply lobed, the laterals prominently stalked, all surfaces pubescent as in stems; stem leaves mostly erect, alternate, progressively shortening up the stem and becoming sessile, pinnately compound or divided.

Inflorescence.--Flowers in uncoiling terminal racemes, becoming well separate as they mature to fruit on appressed-hairy spreading stalks that elongate to nearly 1 cm. in fruit.

Flowers.--Calyx symmetrical, 2.5-3.0 mm long, the 5 narrowly spatulate or linear lobes nearly erect, separate nearly to the base, greenish, appressed-hairy as in stems. Corolla symmetrical, rotate (shallowly cupshaped), mostly 5-7 mm across, the 5 lobes broadly ovate, rounded, nearly entire, about as long as the tube, pale blue with deeper blue veins, the "eye" near white, externally with a scattering of long whitish hairs, internally smooth. Stamens 5, attached low in corolla alternating with lobes, spreading-erect, the slender filaments 5-7 mm long, pale blue with long spreading white hairs toward base, the anthers oblong, blue, about 1 mm long. Ovary superior, broadly ovoid and shorter than the sepals, with long, erect stiff hairs, the style linear with 2 slender branches about mid-length. Capsule broadly ovoid, 3-4 mm long, stiff-hairy, 2-chambered, the seeds dark brown, irregularly oblong, few, minutely pebbled, or foveate (pitted), angled with flattish interfaces.

Distribution and Flowering Season

On and around granite outcrops, in the Piedmont of Georgia and Alabama. Flowering April and May.

Special Identifying Features

According to McVaugh (1943) this variety has more rosette leaflets (7-13, usually 9-11) than var. dubia (3-7) with the terminal segment not greatly larger than the upper laterals and the lateral segments definitely stalked rather than sessile. The stem-leaves are prevalently oblong, rather than obovate or ovate as in var. dubia.

Habitats and Management Implication

Typically the var. georgiana is on thin sandy-silty wash over granite, usually in shallow depressions or cracks. Also it is in the sandy soils surrounding granite or over shallowly underlying granite and frequently extends along sandy road shoulders or fields for several miles around the outcrop areas. It is altogether weedy, often an aspect dominant in such places, always in full sun or very light shade. Its sites, while often moist in winter and spring, invariably become quite dry. Obviously it thrives on the outcrops or in situations that match these, in other words artificial openings in the surrounding oak-pine. Quarrying of the granite is the major threat to this plant, but it will maintain abundantly so long as there are open sandy areas remaining.

References

McVaugh, Rogers. 1943. The vegetation of the granitic flat-rocks of the southeastern United States. Ecol. Monogr. 13 (2): 120-166.

Small, J. K. 1933. Manual of the southeastern flora, pp. 1097-1098. Chapel Hill, N.C.

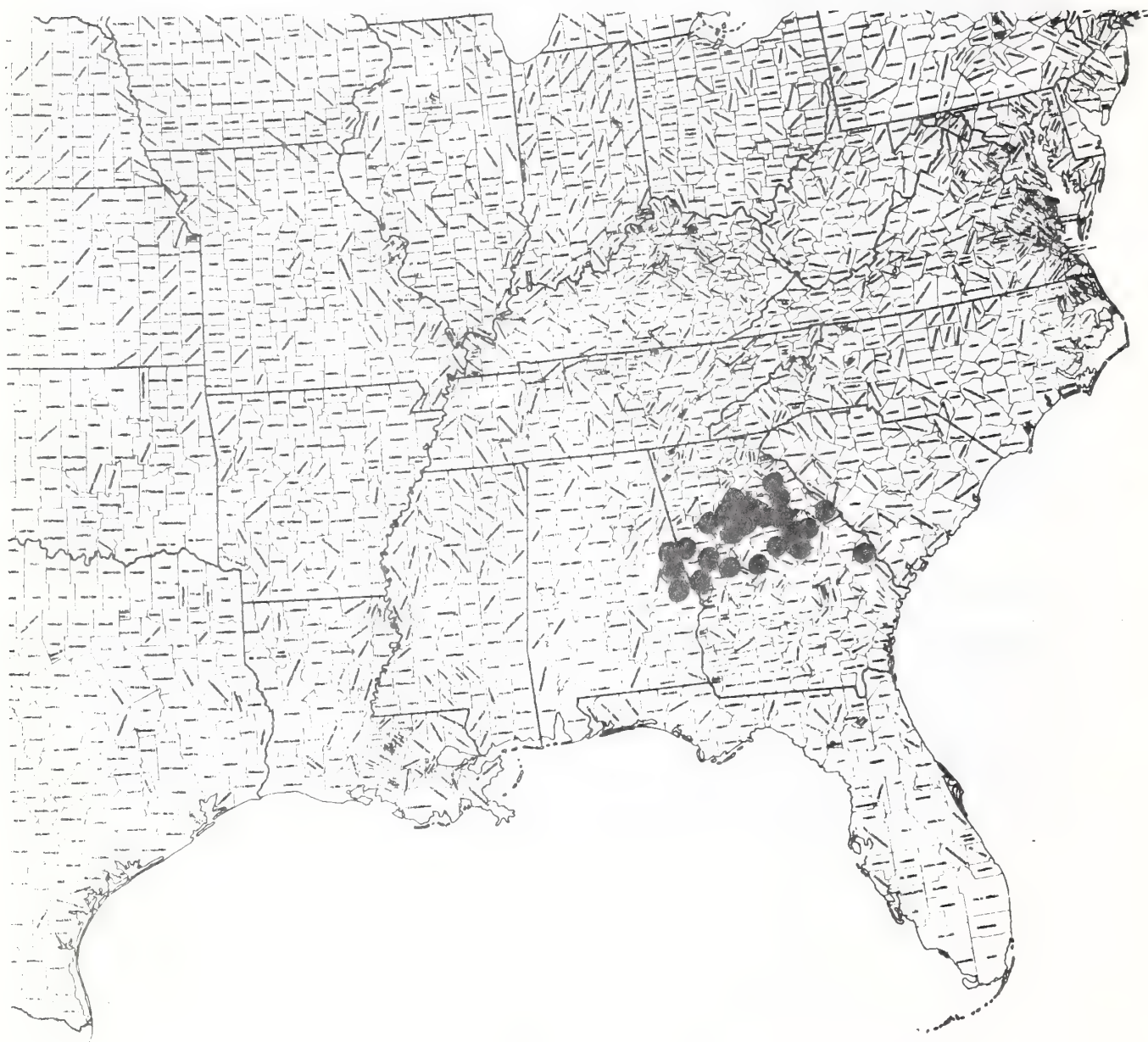
SPECIES: #82 Phacelia dubia (.) Trelease var. georgiana McVaugh. Scorpion we

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy								
Damage								X
No Lasting Effect	NA						NA	
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Phacelia dubia (L.) Trel. var. georgiana McVaugh



HYPERICACEAE

Hypericum edisonianum (Small) Adams & Robeson. Edison's
St. John's-wort; St. Peter's-wort; St. Andrew's-crosses
Ascyrum edisonianum Small

Technical Description

Shrubs to 1.5 dm high, mostly erect at the base.

Stems.--The base terete or nearly so, smooth, the bark pale brown, repeatedly forking-branching above, but essentially leafless save for uppermost branches, there densely leafy, all this from a woody, spreading, shallow root system.

Leaves.--Opposite, sessile, leathery, smooth, elliptic to oblong or broadly spatulate, mostly 1-2 cm. long, ascending, acute, or short-acuminate, entire, the bases rounded, slightly clasping, the upper surface glaucous-green, the lower surface paler and yellow-green, gland-dotted, with a raised midrib; stipules present as large reddish-brown glands at sides of blade bases.

Inflorescence.--Flowers symmetrical, terminating the numerous leafy branchlets, often their bases hidden by leaves, on erect or curved stalks 5-10 mm long, bearing 2, small, narrowly-triangular, scaly bracts well below the calyx base.

Flowers.--Calyx of 2 series, the outer series of 2 largest, erect, broadly elliptic or ovate, mostly 9-15 mm long, acute to short-acuminate, entire, the bases broadly rounded or cordate, clasping; inner pair concealed by outer, shorter, narrower, linear-lanceolate. Petals 4, subequal, 10-18 mm long, distinct obliquely obovate, yellow, spreading. Stamens numerous in a yellowish tuft. Ovary superior, ovoid, the carpels 3-4, styles 3-4, slender. This plant forms thickets, developing shoots at intervals from the spreading shallow roots.

Distribution and Flowering Season

Low prairies, sandy peaty shores, duneswales flatwoods, southern peninsular Florida. Flowers all year.

Specal Identifying Features

This species is distinguished from the closely related Hypericum stans (Michx.) Adams and Robeson by its mainly narrower leaves and outer sepals and its much bushier habit.

Adams (1962) indicates that H. edisonianum has a range distinct from and south of, the widespread H. stans.

Habitats and Management Implication

H. edisonianum is restricted to a few counties in southern peninsular Florida (Highlands, Glade, DeSoto), and typically is on high hydroperiod soils of prairies, pondshores and pineland grass sedge clearings. Here it is admixed with a large variety of grasses, sedges, orchids, polygals, Ludwigia, etc. these amidst a scattering of palmetto. Periodic firing of these prairies and grassy clearings during dry seasons and droughts has helped to maintain such

species as this. Logging, if unaccompanied by drainage, increases H. edisonianum. Plantation level stocking shades it out. The plants, while not used by livestock are broken and trampled by them; improved pasture closes out their reproduction. This genus produces hypericin, a photosensitiser.

References

- _____. 1957. A revision of the genus Ascyrum (Hypericaceae). Rhodora 59(700):73-95.
- Adams, P. 1962. Studies in the Guttiferae I. A synopsis of Hypericum section Myriandra. Contr. Gray Herb. 189: 3-51.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 867-868. Chapel Hill, N.C.

SPECIES: #84 Hypericum edisonianum (Small) Adams & Robson. St. Peter's-wort
or St. Andrew's crosses

Management Practices								
Expected* Effect on the Species	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Hypericum edisonianum (Small) Adams & Robs.



IRIDACEAE

Nemastylis floridana Small.; Fall-flowering pleat leaf;
 celestials or celestial-Lilies

Technical Description

Tall (to 1.5 meters) slender, smooth erect or leaning, wandlike and grasslike plants from ovoid bulbs up to 2 cm broad, the outer scales dark reddish-brown, ovate, acuminate, the innermost scale leaves somewhat longer-tipped.

Stems.--Terete, at most 4 mm thick, tan or pale yellow-green glaucous, flecked with maroon, the nodes slightly swollen, few and distant.

Leaves.--Basal and lower stem leaves pale green very elongate-linear, rarely more than 5 mm broad, to 7 dm long, narrowly attenuate-involute at the tips, the margins entire, the blade bases broadening into open rather short sheaths.

Inflorescence.—A terminal, narrowly and elongate-forking system of long-stalked spathes; spathes 2, overlapping, the lower one shorter, papery-margined, linear, concealing the flower stalks and perianth tubes.

Flowers.--Erect, nearly symmetrical, the sepals and petals spreading horizontally, the flower fully 3.5-4.0 cm broad, blue-violet; perianth segments elliptic to narrowly obovate, the petals slightly smaller. Stamens 3, erect, the filaments very much shorter than the linear (7-8 mm long) yellowish anthers whose tips are coiled. Ovary inferior, short, the 6 style branches spreading, narrow-conic, tapering to narrow stigmas.

Fruit. --- Capsule obovoid, ca. 1.5 cm long, truncate, capped with the lobes of the persistent style branch bases; seeds numerous, about 1.5-2.0 mm broad.

Distribution and Flowering Season

Low, sunny areas in Flatwoods, also swamp and marsh borders, eastern peninsular Florida, mostly along the St. Johns River southward and eastward. Flowering August into October.

Special Identifying Features

This species is similar to the Iridaceous genus Sphenostigma, which see. The only other species of Nemastylis in the southeast is N. geminiflora a plant of heavy prairie earths to the northwest, and which blooms in the morning. N. floridana has flowers which open at about four o'clock in the afternoon, closing toward dusk.

Habitats and Management Implications

N. floridana is locally abundant from Volusia county southward in wet, grassy, sandy peat or peat-muck clearings in slash pine-saw palmetto, at edges of cabbage palm hammocks, or in broad marshes. It is a plant mostly found in full sun or the light shade of hammock edges and savanna pine. Much of the broad marsh along the St. Johns River is now pastured; the improved pasture does not favor the species in that it forms a closed mass of grass bases and rhizomes. Much of the pine flatwoods savanna where it formerly grew is converted to housing as a result of the space program on Merritt Island and the subsequent expansion of Cocoa and Melbourne. Much of the savanna and marsh has been

systematically drained in any event, and drainage eliminates this species together with the grass-sedge complex it is a part of.

References

Small, J. K. 1931. The celestial lilies. Journ. N.Y. Bot. Gard. 32. 266 and Fig. 2.

_____ 1933. Manual of the southeastern flora, p. 326. Chapel Hill, N.C.

Mackiernan, Janice M. & Elaine M. Norman. 1979, Reproductive biology of Nemastylis floridana Small (Iridaceae). Florida Scientist 4:229-236.

SPECIES: #85 *Nemastylis floridana* Small Celestials or Celestial-Lilies

Management Practices								
Expected* Effect on the Species	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X				X
Damage							X	
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Nemastylis floridana Small



IRIDACEAE

Sphenostigma coelestina (Bartr. ex Willd.) R.C. Foster
Bartram's ixia; N.C.N.
Ixia coelestina Bartr.
Salpingostylis coelestina (Bartr.) Small

Technical Description

Erect, perennial, grass-like herb from an ovoid bulb 1.0-1.5 cm broad, the outer bulb scales dark dull brown.

Stems.--Very slender, usually unbranched, often bent at the slightly swollen nodes, greenish, low-ribbed, slightly compressed between the nodes, 2-4 dm long.

Leaves.--Sheath leaves short, narrow, linear, paler brown, erect, thin. Basal leaves 1-3, shorter than the stem, narrowly elliptic-linear, the tips attenuate, the blade somewhat pleated and ribbed, narrowing involutely to a short, mostly open sheath, the sheath bases often strongly tinted with orange-yellow as are the covered bulb scales. Stem leaves reduced, the bases sheathing, the blades to 9 cm. long, 1 or 2, ascending, distant on the stem.

Inflorescence.--Spathes 2, ca. 2-3 cm long, linear, folded-overlapping, thin-margined, greenish, acute, with narrow thin margins tinted at the apex with maroon. Flowers nearly symmetrical, on very slender (narrowly linear) stalks hidden by the spathes, opening laterally to the spathe tip.

Flowers.--Perianth tube very slender, its tip slightly projecting beyond the spathes; perianth segments nearly equal, spreading, pale gentian blue, paler toward the base, oblanceolate or obovate, the tips rounded or (usually) emarginate, the margins entire, the bases cuneate or attenuate to a short claw or sessile at top of perianth tube, the whole flower when fully open fully 5-6 cm. broad. Stamens 3, filaments arising at summit of perianth tube, slender with abruptly flaring thin bases, the anthers yellowish linear-oblong, ca. 4-5 mm long. Ovary inferior, the very elongate slender erect style with 3 narrow, ascending branches these expanded at their tips into 3, fan-shaped, blue-purple, jagged-tipped stigmas projected a cm or slightly more beyond the tip of the perianth tube.

Fruit.--Capsule 1.5-2.0 cm long, erect, short oblong or narrowly obovate, greenish, smooth, projected beyond the spathe tips on a thickened stalk.

Distribution and Flowering Season

Low pine flatwoods, pineland savannas, northeastern Florida. Flowering May, June.

Special Identifying Features

This species, first observed and illustrated by William Bartram, is at a glance most similar to the genus Nemastylis (the Celestial-lilies), but in that genus the anther tips are coiled and the style branches narrow toward the tips, rather than flattened into fan-shaped stigmas. The only Nemastylis that could possibly overlap in range with this would be N. floridana Small, which blooms in the late summer and fall. Also, the Sphenostigma blooms in the morning while N. floridana flowers open toward late afternoon.

Habitats and Management Implication

Sphenostigma coelestina is in high hydroperiod, highly organic (usually black) fine textured sandy soils. It may be in full sun in savanna clearings or in open stands of flatwoods pines such as P. palustris, P. elliotii or P. serotina. Palmetto and gallberry, together with various heaths are common understory shrubs. The associated herbs are mostly grasses and sedges, with a scattering of Xyris, Eriocalaceae, Orchids, Polygala etc. all indicative of the intermittently highly moist soil. Its bulbs, though rather shallowly set in a matrix of grass and sedge roots, seem not to be harmed by periodic fires. Most of the areas where the plants have been seen in abundance have had some recent fire. Occasionally the plants are seen in plantations of pine, usually in evidence where the trees have past the sapling stage and again where there has been a recent burn. Much of the former area of the species has been lost either through expansion of housing, rowcrop agriculture, nurseries, or improved cattle pasture. In most of these events, and in some of the managed tracts of pine, holdovers have probably been destroyed by the drying out resulting from construction of drainage ditches. These soils, on draining, lose much of their organic matter and become dry white sands. This species should be considered endangered rather than merely threatened. Most methods of site preparation involving soil disturbance will eliminate the species, the least objectionable method being bedding.

Interestingly, flowers of the species open at dawn, close at about 10:00 A.M. and during that period make one of the most beautifully conspicuous of mass floral effects. Yet, by late morning and afternoon, when the corollas have withered, the plants seem to disappear, blending into the mass of other grasslike herbs.

References

Foster, R. C. 1945. Contr. Gray Herb. 155:15.

Small, J. K. 1931. Bartram's *Ixia coelestina* rediscovered.
Journ. N.Y. Bot. Gard. 32:161.

_____ 1931. Celestial lilies. Journ. N.Y. Bot. Gard. 32: 266.

_____ 1933. Manual of the southeastern flora, pp. 326-327. Chapel Hill, N.C.

SPECIES: #86 Sphenostigma coelestina (Bartr. ex Willd.) R. C. Foster N.C.N.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X				X
Damage No Lasting Effect			X				X	
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Sphenostigma coelestina (Bartr. ex Willd.) Foster



JUNCACEAE

Juncus gymnocarpus Coville; Coville's rush; rush
J. smithii Engelm. not Kunth.

Technical Description

Perennial herb.

Culms.--To nearly 1 meter tall, green, roundish in cross section, smooth, arising like close-set posts in a picket fence from a shallow, stout, creeping, reddish-brown, scaly rhizome.

Leaves.--All toward base of culm, the lowermost scale-like, reddish or purplish-brown, the uppermost more tubular, upwardly greenish, acute.

Inflorescence.--Sessile or nearly so, the flowers usually several in a diffuse system of cymes (often broader than high), appearing to arise laterally from the gradually tapering culm tip, the branches or clusters of branches arising from small clusters of scaly, green-midribbed, lance-ovate prophylls.

Flowers.--Symmetrical with short prophylls immediately below, these mostly ovate, acute, with broad green midribs. Perianth spreading, the sepals and petals each 3, greenish-brown, 2.0-2.7 mm long, much shorter than the mature fruit, the sepals lanceolate, acuminate, longer than the ovate, round-tipped, broadly thin margined petals. Stamens 6, anthers as long as filaments; ovary superior.

Fruit.--Capsule when ripe with firm pale greenish-brown valves, ovoid, about 3 mm long, the valve edges sharply raised, beaked. Seeds ca. 1 mm long, unequally oblong, with short tails on both ends, many-ribbed.

Distribution and Flowering Season

Swamp woods, mountains of eastern Pennsylvania to the mountains of North Carolina and Tennessee with disjunctions in Coastal Plain, namely northwest Florida, southeastern Alabama, Southern Mississippi. In North, flowering in August; in South, flowering in May, June.

Special Identifying Features

This species, which is being found rather frequently in sphagnum mountain swamp woods is much more rare in the Gulf Coastal Plain. It is most similar to Juncus effusus and J. coriaceus, differing from the former in its longer rhizomes, its perianth (in J. effusus this is as long as or longer than the ripe capsule), and its thicker-walled capsules which narrow toward the tips rather than being blunt. It differs from the latter again in its rhizomatous (rather than clumped) habit, its smaller ovoid (rather than larger and round) capsules, its more delicate inflorescence with usually more flowers.

Habitats and Management Implication

Many Juncus are found in open swamps or marshes. This one is usually in the shade, its rhizomes in peat-muck or sandy peat muck, in the shade of bottomland hardwoods (or cypress-tupelo-swamp, willow oaks in the Gulf South). Often it is near or in mats of Sphagnum, not actually in the deepest swamp but rather the shallower margins.

Cutting of the swamp forests in which this grows may alter the habitat sufficiently to raise the water enough to obliterate this species. Opening up of the swamp

forest tends to admit other plants of more sunny situations which will crowd out the species. Careful selective logging of the overstory should effect it little.

References

Coville, F. V. 1894. Mem. Torr. Bot. Club 5: 106.

Engelmann, George. 1868. A revision of the North American species of the genus Juncus. Trans. Acad. Sci. St. Louis 2: 424-498

Small, J. K. 1933. Manual of the southeastern flora, pp. 281-286. Chapel Hill, N.C.

SPECIES: #87 Juncus gymnocarpus Coville, rushes

Management Practices								
Expected* Effect on the Species	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy						X		
Damage								X
No Lasting Effect	NA				X		NA	
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Juncus gymnocarpus Coville



LAMIACEAE

Calamintha ashei (Weatherby) Shinnars. Ash's savory; Basil
Satureja ashei Weatherby
Clinopodium ashei (Weatherby) Small

Technical Description

Bushy, pungently aromatic shrubs mostly 5 dm tall or less, the 1-several primary shoots from a strong, branched taproot system.

Stems.--The older basal growth with shallowly cracked, pale gray brown bark that peels away in thin strips, the newer shoots numerous, ascending or erect, slender but stiffish, slightly if at all angled, downy with numerous fine short hairs, greenish or greenish-brown.

Leaves.--Of lower older stems absent by flowering time, those of the newer shoots mostly numerous, opposite from nodes 1 cm or thereabouts apart, spreading or erect, linear to narrowly obovate, mostly 1 cm long or somewhat less, acute, the margins entire, strongly revolute, the bases mostly acute or cuneate, the surfaces gray-green with a down of fine hairs, with small glistening glands.

Inflorescence.--Flowers produced oppositely from the axils of all or most upper leaves on ascending, downy hairy stalks about 3 mm long, these with a pair of linear-lanceolate bracts at their bases.

Flowers.--Calyx in flower about 6 mm long, the narrowly campanulate-cylindrical tube dull green, downy, 10-ribbed, about 3 mm long, the limb 2-lipped, the upper lip broadly oblong, maroon, truncately 3-lobed, the lower lip of 2 somewhat longer, narrowly acute, slender tipped, upwardly arching teeth, the rim with a strong tuft of erect, white hairs. Corolla strongly bilabiate, about 1 cm. long, the tube and throat rather slender, 6-7 mm long, whitish to pale lavender-rose, the upper lip short-oblong, projecting slightly upward, rounded-emarginate, lavender-rose, the lower lip projecting downward, 3-lobed with the middle lobe largest, lavender rose toward the tip, toward the base paler with darker mottlings, the corolla surface finely hairy outside. Stamens 4, in 2 lengths of 2, the filaments arching up under the upper corolla lobe but not beyond it, the anthers short-oblong, dark purple.

Fruit.--Nutlets broadly ovoid, nearly round, pale brown, nearly smooth, about 1.5 mm long.

Distribution and Flowering Season

Clearings in sandhills scrub, the Florida central highlands (for lakes country); southeastern Georgia. Flowering intermittently from January to frost.

Special Identifying Features

Most similar to C. dentata, a very rank smelling shrub confined to northwestern Florida and which has broader, somewhat larger, usually cuneate-obovate leaves that have at least some teeth toward the apex.

Habitats and Management Implication

This species, while local, may be extremely common where found. In the sandhills around Reidsville, Georgia (where it was reported by Roland Harper early in the Century) it may form masses in open stands of longleaf pine-scrub oak. There it frequently invades abandoned sandy fields or powerline clearings. It may also seed into young plantations of pine, being shaded out later as the crowns close. In peninsular Florida, the area from which it was first described by Weatherby, it is endangered primarily because of housing development and increasing acreages of orange groves.

References

Shinners, L. H. 1962. Calamintha (Labiatae) in the southern United States.
Sida 1 (2) 69-75.

Small, J. K. 1933. Manual of the southeastern flora, pp. 1168-1169.

SPECIES: #88 Calamintha Ashei (Weatherby) Shimmers, Basil

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X(shade)	
Damage			X	X				
No Lasting Effect								?
Beneficial if Done Properly	NA	X			X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Calamintha ashei (Weatherb.) Shinnery



LAMIACEAE

Calamintha dentata Chapm.; toothed savory; Basil
Clinopodium dentatum (Chapm.) Kuntze
Satureja dentata (Chapm.) Briq.

Technical Description

Pungently aromatic shrubs to 5 dm tall, either simple below or profusely branched even from near the base, usually with dense, full leafy crowns, these frequently as broad as high, and from a woody simple or branched taproot system.

Stems.--Main shoots erect or ascending, gray-brown, the bark thin, cracking, exfoliating, with numerous, opposite, slender but stiffish and brittle, upwardly ascending branchlets, all but the older surfaces dusted with fine short hairs.

Leaves.--Lowest leaves absent by flowering time; leaves of branchlets opposite, spreading or ascending, broadly oblanceolate to obovate, mostly around 1 cm long, the apex rounded and dentate, the margin revolute and low-dentate toward the apex or completely entire, the base broadly to narrowly cuneate, the upper surface yellow-green, dusted with fine gray hairs, gland-dotted, the lower surface paler, prominently dotted with dark glands, the midrib strongly raised and fine-hairy, the petiole very short or absent.

Inflorescence.--Flowers opposite or paired in the axils of most upper leaves, on 2-bracted puberulent stalks to 3 mm long.

Flowers.--Calyx around 6-7 mm long, the tube about 4 mm long, cylindrical, 10-12-ribbed, puberulent and with sessile clear glands, green with tints of maroon on the ribs, with a strong ring of erect white hairs around the rim inside, 2-lipped, the upper lip shorter, upcurved, with 3 triangular, maroon lobes, the lower lip of 2 slender, upcurved, very slender-tipped maroon teeth. Corolla about 15 mm long, strongly bilabiate, the tube and throat narrowly funnel shaped, 7-8 mm long, the upper lip shorter than the lower, oblong, arching forward, the lower lip spreading and directed downward, 3-lobed, the lateral lobes spreading and low, the middle lobe obcordate; outer surface of corolla lavender rose, palest toward the base, all puberulent; inner surface of corolla with upper lip lavender rose and lower lip with a pale median zone, this marked with dark purplish flecks and lines. Stamens 4, of 2 lengths, arching upward under the upper corolla lip, not projecting beyond. Style slender, 2-branched at apex.

Fruit.--Nutlets usually 4, broadly ovoid or nearly round, about 1.5 mm long, brown, nearly smooth.

Distribution and Flowering Season

Deep dry pineland sands, northwestern Florida and southwestern Georgia. Flowering from April to frost.

Habitats and Management Implication

This is perhaps the weediest shrub in the genus, doubtfully threatened within its rather small range. It appears to be equally at home in longleaf pine-deciduous scrub sandhills, dryish longleaf pine flats, sandy open abandoned fields and roadsides, occasionally it is found along the upper edges of ravines forested with beach-magnolia. In such places it has larger, broader leaves and a more slender

habit. Taxonomically it is closest to C. ashei (Weatherby) Shinnars, which has smaller flowers and narrower, more involute, entire leaves.

C. dentata, while most abundant in longleaf pine-turkey oak barrens, appears to maintain itself where there has been clear-cutting or this accompanied by all sorts of site preparation. It is common in slash pine plantations locally within its range, being winnowed out only where the shade and litter become too dense.

References

Shinnars, L. H. 1962. Calamintha (Labiatae) in the southern United States.
Sida 1 (2) 69-75.

Small, J. K. 1933. Manual of the southeastern flora, pp. 1168-1169.

SPECIES: #89 Calamintha dentata Chapm. Basil

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								?
No Lasting Effect		X ^x	NA	X ^x				
Beneficial if Done Properly	NA				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Calamintha dentata Chapm.



LAMIACEAE

Conradina grandiflora Small; large-flowered rosemary; N.C.N.

Technical Description

Pungently aromatic shrubs mostly 1.0-1.5 meters tall (-2 meters) from rather shallow root systems.

Stems.--Shrub base mostly simple, terete, the bark grayish, thin, the outer layer of braided exfoliating strips; branches few to several, spreading or arching, rebranching irregularly, the shrub crown usually broader than long. Branchlets short to elongate, slender but stiff, brownish or reddish brown, quadrangular, canescent (densely short-hairy) with pale hairs.

Leaves.--Persistent, opposite, linear, needle-like, mostly 1.0-1.5 cm long, spreading, the tips blunt, the margins fleshy-involute, the base acute to a short, reddish, terete petiole, the upper surface gray-green, gland-dotted, short-appressed-hairy, the lower surface densely tomentulose with a somewhat less hairy, raised midrib; all leaves producing in their axils short shoots with leaves of normal length, thus the plants appearing quite whorled-leafy.

Inflorescence.--Flowers produced in short-stalked cymes from the upper leaf axils, the inflorescence thus short-cylindric.

Flowers.--Flowering calyx tubular, 7-8 mm long, bilabiate, the upper lip about 3 mm long, short-oblong, 3-toothed apically, the lower lip of 2, narrow, sharp-tipped, rigid, forward-and-upward arching teeth about 3 mm long, the tube 4-5 mm. long, 10-12-ribbed, greenish with the ribs maroon, puberulent and gland-dotted, the tooth margins ciliate. Corolla mostly fully 2 cm long, the narrow tube bent just above the level of the calyx tube opening, the throat broadly funnel-form, the limb strongly bilabiate, the upper lip arching forward, oblong, emarginate, somewhat shorter than the downwardly arching and spreading, 3-lobed, lower lip which is 9-16 mm long; surface externally pilose-puberulent, that of the tube and throat pale lavender, that of the lips deeper lavender-blue, the lower lobe medially nearly white with strong blotches of deep lavender-blue. Stamens 4, of 2 lengths, arching on long slender smooth filaments up and under the upper corolla lip and projecting the short anthers beyond its tip. Style arching as in the stamens, slender, smooth, forking at its apex into 2 short, spreading lobes.

Fruit.--Nutlets nearly round, nearly black, smoothish, the attachment scar basal-lateral.

Distribution and Flowering Season

Sandy flats or sandhills, mostly with sand pine, eastern peninsular Florida from Volusia County southward to Palm Beach County. Flowering all year.

Special Identifying Features

There are but 5 species in this genus, all southeastern, all but 1 considered rare or local. C. grandiflora differs from the others in having the largest flowers, these in cymes of 1-12 on evident stalks.

Habitats and Management Implication

This species is always on deep, fine sands, usually on or in the vicinity of ancient dunes of shores, typically in or around stands of Pinus clausa and ad-

mixed with Lyonia, Ilex, various evergreen scrub oaks, Ceratiola, Polygonella, Opuntia, Saw-palmetto. It responds vigorously to fire, being released in this way from competing shrubs, and from overstory shade. It is an invader of mechanically disturbed sands within its range, but is winnowed out in fully stocked plantations of sand pine. Most of its area is in the coastal dune country along the coast, thus it is endangered primarily through the conversion of these sandhills to housing developments, resort developments, commercial developments, and orange groves.

References

Shinners, L. H. 1962. Synopsis of Conradina (Labiatae).

Sida 1 (2): 84-88.

Small, J. K. 1933, Manual of the southeastern Flora, pp. 1166-1167.

SPECIES: #90 Conradina grandiflora Small. N.C.N.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage								
No Lasting Effect			NA					?
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Conradina grandiflora Small



LAMIACEAE

Dicerandra odoratissima Harper. Rose dicerandra; N.C.N.

Technical Description

Strongly aromatic annual herb to 4 dm tall from a taproot that is often thickened by gall formation.

Stems.--Erect, simple or branching from near the base from all or most of the main nodes and thus producing a bushy crown; lower part of stem brownish with thin, exfoliating bark, nearly terete, becoming upwardly quadrangular, reddish-tinted, scabrous or puberulent with stoutish, incurved short pale hairs, and also gland-dotted.

Leaves.--Opposite, evenly distributed along the stem, erect, spreading or recurved, often with axillary leafy short shoots; leaf blades narrowly linear, (the lowermost, preflowering ones may be broader), to 4 cm long, blunt, the margins scabrid, fleshy, strongly inrolled, the bases nearly sessile, the surfaces above scabrid, greenish or maroon tinted, gland-dotted, medially grooved, beneath paler, smoothish or puberulent, strongly gland-dotted, with a single strongly raised median, scabrid vein. Largest leaves toward base, gradually narrowing and shortening upward into the inflorescence.

Inflorescence.--Flowers single or in few-flowered, nearly sessile cymules from leaf axils mostly from midstem upward, in colorful "liatrislike" cylindrical systems. Flower stalks shorter than the calyxes, spreading-ascending, maroon with a strong dusting of short whitened hairs.

Flowers.--Calyx cylindrical, around 8 mm long in flower, strongly 12-ribbed, greenish with the ribs maroon, or strongly maroon tinted, bilabiate, the upper lip 1.5-2.0 mm long, arching slightly upward, low-triangular, ciliate, the lower lip about 3 mm long, cleft nearly to its base to form 2 very narrowly triangular, subulate, stiffish teeth that project forward, curve slightly upward; calyx tube surface strongly gland-dotted between the ribs, otherwise smooth, the nerves appressed-puberulent, the tooth edges ciliate, the tube orifice thin bearing within a ring of whitish, erect hairs (an annulus), and externally whitened or rose. Corolla strongly bilabiate, 2.0-2.5 cm long, the tube and throat narrowly funnelform, about 1.5 cm long, lavender-rose or somewhat paler toward the base, the upper lip oblong-ovate, arching forward, about 5 mm long, its tip rounded or slightly emarginate or with 3 low, rounded teeth, its back keeled, short-hairy, the lower directed downward, 7-8 mm long, strongly 3-lobed, the lobes obovate, the lateral ones slightly shorter and rounded, the median emarginate; outer corolla surfaces a bright lavender-rose, softly puberulent externally, the lower lip lined within with yellowish or paler lines, also freckled with dark purplish spots. Stamens 4, on slender filaments arising from near the throat apex, arching upward under the upper corolla lip, the anthers concealed just below its tip; anthers nearly round, each with a prominent spur. style slender, elongate, projecting upward under the upper corolla lip with the stamens, its tip short pubescent, 2-branched.

Fruit.--Nutlets nearly round, about 1 mm long, pale to deep brown, nearly smooth or minutely pitted.

Distribution and Flowering Season

Local in sandhills in the lower Coastal Plain, eastern South Carolina southward to southeastern Georgia. Flowering from September to frost.

Special Identifying Features

There are but six species of Dicerandra, all in the southeastern United States. Three are shrubs restricted to Florida. This, together with the remaining 2 is annual, and distinguished from the other annuals by the fact that its stamens do not project beyond the upper corolla lip, by its much longer lower calyx lip which is divided nearly to the base, and by its non-geniculate corolla.

Habitats and Management Implication

All the Dicerandra are plants of deep, nearly pure sands. This species is always in pine (longleaf and slash), usually on sand ridges sandy fields, or sandy rises in or bluffs along rivers. It is a plant of light shade or full sun. It readily invades such disturbed areas as dryish sites prepared for pines, abandoned sandy fields, roadsides, etc. Fire (not recommended as a management tool for sandhills but a natural factor there!) increases it by decreasing competing shrubs (scrub oak, Ceratiola, Persea, Calamintha) and grass-sedge competition, as well as the shade of the pine or oak-pine overstory. The plants, as mentioned above, come in strongly after any site preparation involving exposure of the sands; however, they disappear as the pines establish and close crowns.

References

Shinners, L. H. 1962. Synopsis of Dicerandra (Labiatae).
Sida 1(2): 89-91.

Small, J. K. 1933. Manual of the Southeastern Flora, pp. 1169-1170. Chapel Hill, N.C.

SPECIES: #91 Dicerandra odoratissima Harper. N.C.N.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								
No Lasting Effect			NA					?
Beneficial if Done Properly	X	X			X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Dicerandra odoratissima Harper



LAMIACEAE

Physostegia veroniciformis Small. Veronica dragon-
head; false dragon-head or obedient plant
Dracocephalum veroniciformis Small

Technical Description

Perennial herbs mostly 6-8 cm tall, from stout, erect or ascending, simple or forking rhizomes.

Stems.--Solitary or few, stiffly erect or ascending, yet slender, quadrangular with the angles rounded, the interfaces flat or concave, toward base smooth, pale green, toward the tips, spreading puberulent and tinted with maroon.

Leaves.--Opposite, on widely separated nodes, ascending or erect, the basal ones long-petiolate, the blades elliptic or lanceolate, those toward midstem nearly sessile, spatulate or oblanceolate, mostly 3-4 cm long, the apex blunt, the margins entire to sinuate or saliently low-toothed with teeth distant and toward the blade apex, somewhat revolute, the base narrowly cuneate or attenuate, nearly sessile, the surfaces pale yellow-green, smooth, minutely dotted, the upper surface grooved along the midrib, the lower surface with midrib strongly raised: leaves gradually diminishing in size upward becoming completely sessile, lanceolate, grading into lanceolate inflorescence bracts less than 1 cm long.

Inflorescence.--Flowers born in open, erect, spikelike racemes (internodes elongate during and after flowering), ascending on spreading-puberulent stalks 2 mm or less long.

Flowers.--Calyx in flower tubular-narrowly funnelform 5-6 mm long, the tube longer than the 5, triangular, short-acuminate nearly equal teeth, the surface externally greenish with tints of maroon, spreading puberulent. Corolla very bilabiate, slightly less than 2 cm long, the tube pale, tubular, 5-6 mm long, expanding into a broadly funnelform throat 6-7 mm long, the upper lip broadly obovate, about 3 mm long, projecting forward and slightly upward, its back slightly keeled, the lower lip directed downward, 3 lobed, the laterals spreading, short-oblong, round tipped, the middle longest, oblong, emarginate; surface of throat and lips externally lavender rose, puberulent, lined with deeper purple veins, the inner surface of the lower lip longitudinally lined and dotted with deep purple (pollination guides). Stamens 4, of 2 lengths, epipetalous, the filaments curving upward under the upper corolla lip, the anthers short, dark, nearly round; style elongate, curving upward with the stamens and about as long, slightly forked apically.

Fruit.--Nutlets 2 mm long, ovate, smooth, brownish, the outer face convex, the inner 2 faces concave.

Distribution and Flowering Season

Hillside bogs, ditches, seeps, wet open pinelands, southern Georgia southwestward to northern and northwestern Florida. Flowering May into July.

Special Identifying Features

This has the smallest flowers of the southeastern species of Physostegia, the corolla being less than 2 cm long (the other species have corollas over 2 cm long),

the calyx proportionately smaller. The plants are also smaller than are the other species.

Habitats and Management Implication

Optimum habitat for P. veroniciformis consists of high hydroperiod, mucky, sphagnum bogs where it mingles with pitcher plants, sundews, butterworts, various eriocauls, Xyris, sedges and grasses, usually in full sunlight or light shade, often in clearings of wax myrtle, Magnolia, Persea, Nyssa (ogechi, biflora), Pinkneya, etc. The most important overstory species would be Pinus palustris, P. serotina, P. elliottii. Clear cutting would effect it little, perhaps increase it, providing this is not accompanied by mechanical site preparation or drainage, which in either case would eliminate this plant. As is true of most pineland bog forbs, it is increased by burning of competing shrub, tree, or grass competition. It is now being reduced over its range mainly by conversion to drained plantations of pine (which first dries the habitat, later shades it) or improved pasture which usually also involves drainage.

Reference

- Small, J. K. 1903. Flora of the Southeastern United States, pp. 1028 - 1337. New York
- _____. 1933. Manual of the southeastern flora, pp. 1156. Chapel Hill, N.C.

SPECIES: #92 Physostegia veroniciformis Small False Dragon-head or Obedient plant

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								?
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Physostegia veroniciiformis Small



LAMIACEAE

Pycnanthemum floridanum Nash ex Grant & Epling. Florida
mountain-mint; mountain-mint
Pycnanthemum floridanum Nash (Nash 2259, nom. nud.)

Technical Description

Powerfully aromatic perennial from a short stout caudex and several shallow, spreading stout and long-tapering roots, increasing by means of shallow or surface creeping, slender, stolons.

Stems.--Usually solitary, erect, sometimes to fully 2 meters tall, profusely upwardly arching-branched above, the lowest part woody, sometimes to 1 cm thick, the bark thin, reddish-brown, smooth, breaking and peeling, above becoming quadrangular, yellow-green, with short downcurved hairs along the angles, the interfaces flat, smoothish to hirsute and puberulent, more densely so toward branch and shoot tips.

Leaves.--Lowest leaves absent by flowering time, the largest at about mid-stem, opposite in numerous pairs, spreading, ovate or lanceolate, on hirsutulous short (usually under 4 mm long) petioles, the tips short acuminate or acute, the margins ascending-toothed (coarsely low-serrate), the bases acute, rounded or broadly cuneate, both surfaces green and sparingly hirsute to smooth, hirsute along the veins beneath, both surfaces copiously gland-dotted. Leaves gradually getting smaller, more sessile, upward toward the inflorescence, their upper surfaces whitened by dense tomentum, as are those of the bracts and bractlets.

Inflorescences.--Made up of dense clusters of short-stalked, bracted cymes, these clusters axillary to the uppermost pairs of bracteal leaves, hemispherical in outline, broader than high, about 2 cm across. Lowermost bracts of flower clusters narrowly ovate, those subtending flowers narrower, all densely tomentose-puberulent with a scattering of pale longer hairs, the whole inflorescence therefore appearing pale gray-green.

Flowers.--Flowering calyx cylindric or narrowly funnelform 4.0-4.5 mm long, the 5, triangular-acuminate teeth approximately equal (through the calyx rim is oblique), around 1 mm long, the calyx surface gland dotted and also densely appressed puberulent and hirsute externally. Corolla 4-5 mm long, strongly bilabiate, the short tube broadening into a longer, funnelform throat, the upper lip short-oblong, projecting forward, its back rounded, its apex rounded, shallowly emarginate, the lower lip directed downward, 3-lobed, the lobes rounded; corolla surface hirsutulous externally, pale lavender to near white, the lower lip mottled with purplish blotches. Stamens 4, in 2 lengths but nearly equal, the filaments arching upward under the upper corolla lip. Style elongate, slender, slightly forking at the apex.

Distribution and Flowering Season

Pine-palmetto flatwoods, pineland savannas, middle and northern peninsular Florida; flowering July and August.

Special Identifying Features

This species resembles P. muticum vegetatively, particularly in regard to the nearly smooth lower leaves and in general appearance of the plant. In its calyx (of subequal members) it is most similar to P. incanum. Where this writer has collected it there appeared no other Pycnanthemum species mixed with it.

Habitats and Management Implication

The habitat of P. floridanum varies from quite wet swales or ditches in pine flat-woods and open rangeland to open shrub-grass sedge-pine savanna, the soil being usually a black sandy peat. The overstory is usually a dotting of slash pine, pond pine, longleaf pine or a mixture of the three with a shrub understory of gallberry, Lyonia, Myrica, Saw-palmetto. The plants may appear abundantly in interspersed clearings of grass-sedge, and distinct because of their tendency to form large clones, the very whitened upper surfaces of their upper leaves making them visible from a considerable distance.

Clear cutting would increase the species in that it reduces shade. All methods of site preparation save bedding would reduce it. Drainage would eliminate it. It is part of a complex of shrubs and herbs which is maintained through fire, thus fire as a management tool would probably increase it. Such plants as I have seen in pastures do not appear to be browsed by livestock, the main damage to them being by trampling.

References

Grant, Elizabeth and Carl Epling, 1943. A study of Pycnanthemum (Labiatae).
University of California Publications in Botany 20(3): 195-240.

Small, J. K. 1933. Manual of the southeastern flora, pp. 1171-1175. Chapel Hill, N.C.

SPECIES: #93 Pycnanthemum floridanum Nash ex Grant & Epling Mountain-mint

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								?
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Pycnanthemum floridanum Nash
ex Grant & Epling



LAMIACEAE

Scutellaria floridana Chapm. Florida skullcap;
skullcaps or helmet-flowers

Technical Description

Perennial, odorless herb at most to 4 dm. tall from a forking system of fleshy but slender, yellowish rhizomes these at intervals developing fascicles of swollen-linear unbranched storage roots.

Stems.--Solitary or few, mostly erect or ascending, simple or sparingly and oppositely branched, quadrangular, the angles rounded and firm, low-scabrid, the interfaces flat or concave, mostly smooth, purplish toward the base, greenish upward.

Leaves.--Opposite, distant on internodes longer than themselves, erect or somewhat spreading, the largest at about mid-stem, linear, 2-4 cm long, narrowing to blunt, callused, purplish tips, the margins strongly inrolled (revolute), the bases sessile or nearly so, acute, the blade surface strongly gland dotted, pale yellow green, only the mid-nerve evident as a shallow groove above, strongly raised beneath, the upper surface smooth or minutely scabrid.

Inflorescence.--Flowers well separated, solitary in the axils of bracteal leaves that are short-linear (mostly 1 cm or less long), in variously elongate terminal racemes. Flower stalks 5 mm long or less, somewhat spreading-ascending, puberulent, rigid.

Flowers.--Calyx expanding in fruit, in flower about 4 mm long, campanulate, shallowly 2-lobed, bearing on its upper side near the apex a "cap" or "scutellum", the outer surface greenish with tinges or maroon or purple, gland-dotted, also minutely puberulent. Corolla fully 2.5 cm long, strongly bilabiate, the short tube bearing within an oblique annulus (ring of hairs) and there bent upward into a funnellform throat about 1 cm long; upper corolla lip arching forward, strongly keeled, 3-lobed with the median lobe longest, short-oblong, retuse, the laterals shorter, projecting forward and spreading outward, rounded; lower lip directed somewhat downward and spreading, broadly ovate, emarginate, wavy margined; corolla surface a bright lavender-blue, the throat beneath whitish, the inner face of the lower lip with a prominent white median patch that is mottled with deep lavender-blue flecks and guidelines. Stamens 4, of 2 distinct lengths, their filaments arching upward under the upper corolla lip but not beyond, the short anthers with their backs long-bristly-hairy. Style elongate-curved as in the filaments but longer and projecting beyond the corolla to curve downward at the forked tip.

Fruit.--Nutlets nearly round, about 1.5 mm long, dark brown, strongly pebbled (muricate).

Distribution and Flowering Season

Pine-palmetto flatwoods, savannas, northwest Florida in Franklin, Liberty and Gulf Counties; flowering May, June.

Special Identifying Features

This is the rarest of the southeastern Scutellaria, being extremely local within its small range. It is most similar to narrow leaved forms of S. integrifolia

and to S. glabriuscula. However it is a smoother plant and all its leaves in addition to being either scale-like or linear, are entire and are usually shorter than either of those two species.

Habitats and Management Implication

A typical habitat for this species would be the nearly black, humus enriched, high hydroperiod sands of the lower coastal plain terraces around Apalachicola or not far inland. The overstory is usually a dotting of slash and longleaf pine, the shrub understory mainly a mixture of palmetto, gallberry, Lyonia, Myrica, The Scutellaria grows in grass-sedge dominated clearings that are maintained in this type by periodic burns, often in association with other endangered species such as Verbesina chapmanii, Justicia angustifolia, Aclepias viridiflora, Euphorbia telephoides, Macbridea alba, Cuphaea aspera, etc.

Present land management policy within the range of this plant clearly is reducing the species. Some of the range has been cleared for improved pasture. This usually means drainage, which eliminates the Scutellaria even before the introduced Bermuda or Pensacola grass crowds it out. Or, it means clearcutting of the pine, site preparation involving drainage, mechanical site preparation (the least objectionable method involving bedding) and establishment of plantations of pine. Eventually the Scutellaria and most associated species are either lost through drying of the habitat or through the dense shade of the pines. The plants appear to hold over vegetatively for long periods in the rough under stands of large pine, abundantly sprouting and blooming shortly after these areas are burned. It is simply another species which is a part of fire maintained pineland savanna. Unless management practice in the area is changed this plant will completely disappear.

References

Epling, Carl. 1942. The American species of Scutellaria. Univ. Calif. Publ. in Bot. 20 (1): 1-146.

Small, J. K. 1933. Manual of the southeastern flora, pp. 1149-1153. Chapel Hill, N.C.

SPECIES: #94 *Scutellaria floridana* Chapm.; Skullcap or Helmet-flower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	X
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Scutellaria floridana Chapman



LAMIACEAE

Scutellaria montana Chapm. Large flowered skull cap
skullcap or helmet-flower

Technical Description

Perennial, odorless, at most to 6 dm tall, from a short erect caudex, from which arise numerous thickish, simple, primary roots.

Stems.--Erect or ascending, quadrangular, the faces rather soft, pale green, spreading-pilose with whitish, often gland-tipped, hairs.

Leaves.--Lowermost stem leaves usually smallest, long petiolate, the blades triangular-ovate; median or uppermost stem leaves largest, spreading on shorter, wing-edged petioles, the blades 6-10 cm long, elliptic or ovate acute or acuminate, coarsely serrate, the bases attenuated gradually or abruptly into the petiole wings; leaf surfaces dark green above with scattered, appressed, weak hairs, paler and soft-appressed hairy beneath, pilose along the raised veins.

Inflorescence.--Flowers few to several, opposite in terminal, often leafy-bracted, racemes. Flower stalks spreading, slender but stiffish, pilose, up to 5 mm long, the lowermost stalks subtended by petiolate, leafy bracts, the uppermost with bracts smaller but still longer than the flower stalks.

Flowers.--Calyx in flower campanulate, greenish, about 4 mm long, 2-lobed with a "cap" just above the base of the upper lobe, the surface pilose with gland-tipped hairs, also puberulent. Corolla strongly bilabiate, fully 3 cm long, the short tube bent upward at calyx summit into a narrowly funnelform throat, the 2 lips less than 1/2 the corolla, the upper one arching forward, somewhat keeled, 3-lobed, the terminal largest and emarginate, the laterals shorter, spreading forward, rounded, the lower lip directed somewhat downward, broadly ovate, slightly emarginate, the edges entire or erose; corolla surface pilose externally, pale blue at the upper throat and lips, shading to near white toward the base, the lower lip internally bearing blue-purple splotches and guidelines. Stamens 4, of 2 lengths, the filaments arching upward under the upper corolla lip, the anther backs pilose. Style elongated beyond the stamens and exerted slightly at the level of its forking apex.

Distribution and Flowering Season

Mixed hardwood-pine forest at southern end of Blue Ridge, northwestern Georgia and southeastern middle Tennessee; flowering May, early June.

Special Identifying Features

This species, with its large, pale blue flowers is closest to S. pseudoserrata, another rare species of the southern Appalachians, but differs from it in that its lower leaf surfaces are pubescent throughout (in S. pseudoserrata the hairs are confined to the leaf veins).

Habitats and Management Implication

S. montana is in rocky ravine-slopes and stream bottoms that have gravelly fine sandy loams, usually quite well drained. The overstory is of hardwoods mixed with

some yellow pine, thus these plants receive considerable shade. It is not known how this species responds to heavy logging of the overstory but it is likely that clearcutting would promote the increase of competing undesirable shrubs (Lonicera, Rubus) and vines (Pueraria, Lonicera, Smilax) which would tend to crowd them out. The steepness of the terrain this species is in precludes mechanical site preparation.

References

- Collins, Leo. 1976. A revision of the annulate species of Scutellaria (Labiatae). Unpublished PhD. thesis, Vanderbilt University.
- Epling, Carl. 1942. The American species of Scutellaria. Univ. Calif. Publ. Bot. 20 (1): 1-146.
- Small, J. K. 1933. Manual of the southeastern flora. pp. 1149-1153.

SPECIES: #95 Scutellaria montana Chajm. Skullcap or Helmet-flower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy					X	X		
Damage	X	NA						
No Lasting Effect				X				?
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Scutellaria montana Chapm.



LAMIACEAE

Scutellaria thieretii Shinnars.; Thieret's skullcap;
skullcap or helmet flowers

Technical Description

An annual herb from a taproot.

Stems.--Erect or erect with short-curving bases, single or few, rarely branching, rarely longer than 6 dm pale green, spreading white-hairy.

Leaves.--In several pairs, opposite, short-stalked, spreading, the blades mostly ovate, rarely longer than 2 cm round-tipped, the margins unevenly low-crenate or low serrate, the bases attenuate, the surfaces pale green, softly short-hairy.

Inflorescence.--Flowers solitary in axils or mid and upper leaf pairs, spreading, on short, spreading-hairy stalks.

Flowers.--Calyx about 4 mm long (elongating in fruit) glandular short-hairy and ciliate mostly maroon. Corolla strongly 2-lipped, 7-14 mm long, the tube (fused part) near white, the lips bluish, the lower lip with a whitish center.

Fruit.--Nutlets nearly round, about 1.0-1.5 mm long, pebbled, dark brown.

Distribution and Flowering Season

This species is found only in the lower parishes of Louisiana, on shell sand or shell ridges, or in sandy meadow like clearings, these usually not far from brackish marsh. It blooms from April to June.

Special Identifying Features

It is closest taxonomically to S. drummondii Benth., a species whose lower leaves are smaller and longer-stalked, and whose upper (bracteal) leaves are conspicuously shorter than the flowers. In S. thieretii the leaves are hardly if at all reduced in size upward on the stem and the flowers are thus shorter than the leaves.

Habitats and Management Implication

S. thieretii has some weedy tendencies, appears to frequent small clearings, on moist but well drained sands, where the forest is dominated by Locust (Gleditsia) and Southern Hackberry (Celtis laevigata). Cutting of species would probably not effect it much, so long as the soils were not radically disturbed. Nothing is known about the response of this plant to grazing.

References

Shinnars, L. H. 1963. Sida I, No. 3: 251-252.

SPECIES: #96 Scutellaria thieretii Shimmers, Skullcap or Helmet-flower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								
No Lasting Effect								?
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

LAMIACEAE

Stachys lythroides Small. hedge-nettles

Technical Description

A rather slender but tall (to nearly 1 meter) perennial herb, spreading vegetatively by elongate, whip-like slender stolons.

Stems.--Erect often with numerous, opposite, slender ascending branches, strongly 4-angled, the angles sharp or rounded, the interfaces concave, each a strong groove, the stem surfaces pale green or with touches of red below, smoothish or with scattered, stiff, spreading or reflexed pale hairs and spreading-bristly at the nodes.

Leaves.--Opposite, oblong, elliptic-oblong, or lanceolate the longest 6 cm. long, slightly broader than 1 cm.; blades subsessile or on stalks no longer than 3 mm., spreading, in numerous pairs on the stem and branches, acute, low-toothed, the bases narrowly rounded or acute, the surfaces smooth.

Inflorescence: Flowers nearly sessile, spreading appearing whorled in the axils of the upper leaf-pairs, in bloom slightly longer than 1 cm.

Flowers.--Calyx narrowly bell-shaped, about 5 mm. long the sepal bases fused, the lobes 5, triangular-acuminate, erect, about as long as the tube, the surfaces with a few spreading stiff hairs. Corolla strongly 2-lipped, about 1 cm. long, pink, the lips somewhat shorter than the tube (fused part), the upper one projecting forward, oblong, the lower directed downward, 3-lobed; outer surface of upper lip with short, bristly hairs, that of lower lip sparsely so, that of the corolla tube scattered-short-hairy. Stamens 4, the dark anthers with spreading locules, projected beyond the corolla tip on slender, flattish, hairy filaments.

Fruit.--Nutlets about 2 mm. long, broadly obovoid.

Distribution and Flowering Season

This hedge-nettle is confined to low sandy or sandy-peaty areas of bottomland hardwoods, usually near streams and in shade or full sun. So far it is known only from northern Florida. It blooms in mid and late summer.

Special Identifying Features

It is closest in appearance to S. hyssopifolia, but that species has very narrow sharp, stiff sepal tips and entire leaves. It also bears a resemblance to S. ambigua, but that species is more pubescent and has more strongly serrate, hairy leaves. The genus is currently under revision, so that all these might ultimately be considered subspecies.

Habitats and Management Implication

S. lythroides appears to react, within its narrow range, almost as a weed to such disturbance as clear-cutting. An R. K. Godfrey collection (73824) from Leon County north of Tallahassee (the county which the species was first found) is

from a clear-cut area of bottomland hardwoods from which all slash and stumps were removed. Here the plants were abundant, quite possibly responding through removal of shade and woody plant competition. Under normal conditions such a species probably maintains itself in small natural clearings in such forest. However, drainage of bottoms would probably eliminate the species from the habitat.

References

Small, J. K. 1933. Manual of the Southeastern Flora: pp. 1159-1161. Chapel Hill, North Carolina.

Stachys lythroides Small



IN SENATE

JANUARY 18, 1907

REPORT

OF THE

COMMISSIONERS OF THE LAND OFFICE

IN

RESPONSE TO A RESOLUTION PASSED BY THE SENATE

APRIL 18, 1906

ALBANY

PRINTED BY THE STATE PRINTING OFFICE

LAMIACEAE

Synandra hispidula (Michx.) Baill.; N.C.N.

S. grandiflora Nutt.

Technical Description

Annual or biennial herb bolting from overwintering rosettes.

Stems.--Solitary or several, to 5 dm. long, erect or ascending, rather stout but soft, quadrate, pale green with a scattering of spreading soft hairs.

Leaves.--Rosette leaves present at flowering, on long, spreading-hairy stalks the blades broadly ovate, acute or acuminate, the margins crenate, the bases cordate, the surfaces appressed-hairy. Stem leaves opposite, crowded toward the base, distant toward mid-stem, also long-stalked and with blades similar to rosette leaves, those in the inflorescence becoming sessile and smaller.

Inflorescence. Flowers in narrow, leafy-bracted racemes, solitary, erect and opposite in the bract axils, sessile, showy.

Flowers.--Calyx bell-shaped, about 1 cm. long, the lobes triangular, ciliate subulate (with sharp narrow stiff points) longer than the tube (fused part), the surfaces villous (long-soft-hairy). Corolla strongly bilabiate, about 4 cm. long, the tube and throat yellowish-white, narrowly funnelform, the upper lip arching forward, broad, the lower of 2 spreading narrower lobes and a central broader downward-pointing retuse lobe, this marked with purple guide-lines, the outer surface finely hairy. Filaments 4, of 2 lengths, hairy, projecting beyond corolla throat; fertile anthers 2, short-spurred.

Fruit.--Nutlets obovoid, smooth, ca. 3 mm. long.

Distribution and Flowering Season

This species is found in rich, mixed-mesophytic forested ravines, usually in moist to even wet loams or clay loams and primarily over limestone parent material, often on and around rocky detritus. It occurs from southern Illinois and Ohio southward through Kentucky and Tennessee into northeastern Alabama and flowers in May and June.

Habitats and Management Implication

S. hispidula is definitely a shade plant, requiring soil that is highly loamy and permanently moist. Careful selective logging, which would limit danger from subsequent erosion or serious opening of the canopy, would probably not effect it adversely. Clear cutting in the steep situations it frequents would, through erosion, subsequent drying, and excess insolation eliminate the species. Grazing would similarly reduce or eliminate it, probably through disturbance of the plants and the soil by trampling; comparison of grazed versus ungrazed woodlands where this plant occurs shows no plants where cattle are allowed.

References

1. J. K. Small. 1933. Manual of the Southeastern Flora, pp. 1156-1157. Chapel Hill, North Carolina.

Synandra hispidula (Michx.) Baill.



LAURACEAE

Lindera melissaefolium (Walt.) Blume. Swamp spice bush;
Jove's-fruit
Benzoin melissaefolium (Walt.) Nees

Technical Description

Low, aromatic, deciduous, thicket-forming shrub, rarely to 1 meter tall.

Stems.--Numerous; shoots erect or ascending, the young twigs hairy, the buds densely hairy.

Leaves.--Alternate, drooping on short, slender, hairy petioles, the blades oblong, elliptic or narrowly ovate, thinnish, 5-16 cm long, 2-6 cm wide, acuminate, entire, the bases rounded, dark green above, paler and pubescent beneath.

Inflorescence: Plants unisexual. Flowers in short stalked umbels in the axils of the leaf scars, opening before the leaves, usually few to cluster on pedicels 9-12 mm long.

Flowers.--Sepals 6, oblong, about 2 mm long, bright yellow. Staminate flowers with 9 fertile erect or ascending stamens, the anthers opening by valves (flaps). Female flowers with numerous orange-yellow fleshy staminodes, the ovary superior, ovoid, with an elongate style.

Fruit.--Fruiting pedicels stoutish, definitely thickened apically. Drupes ellipsoidal or obovoid, 10-12 cm long, bright red when ripe.

Distribution and Flowering Season

Sandy sitty sink hole depressions and swamps, in the Coastal Plain from North Carolina south to northern Florida, thence west to Louisiana and north in the Mississippi Embayment to southeastern Missouri. One of our rarest shrubs.

Special Identifying Features

The observations of Dr. Julian Steyermark (1949) are the best. He noted the following differences with the quite common Spicebush, L. benzoin (L.) Blume.

1. It is a shorter shrub. L. benzoin grows to mostly 1.6-4.5 meters.
2. Crushed twigs and leaves have a sassafras odor in contrast to the strong benzine odor of L. benzoin.
3. The leaves of L. melissaefolium droop; those of L. benzoin are spreading or ascending. Those of the former are densely hairy beneath; most L. benzoin (save for L. benzoin var. pubescens) tend to be smooth or smoothish. Bases of leaves of L. melissaefolium tend to be rounded; those of L. benzoin taper.
4. Fruiting pedicels are stouter, longer, more enlarged toward the tip: also they tend to persist on the shrubs until flowering time, while in L. benzoin taper.

Habitats and Management Implication

Both species frequent soils that never dry out, but L. melissaefolium is strictly confined to swamp hardwood sites while L. benzoin is very often understory to mixed-mesophytic forest.

The common species of overstory for L. melissaefolia are various swamp oaks (Q. palustris, Q. phellos, Q. laurifolia, etc.) hickories, ash, Acer saccharinum, Arubrum. Steyermark (l.c.) found the shrubs in sandy potholes dominated by an overstory of Pin Oak and Pumpkin Ash, with what remained of the surrounding higher forest being made up of Sugar Maple, Flowering Dogwood, Aralia, Asimina.

It is obvious that this shrub is a plant of high hydroperiod soils; it is frequently found in standing water. Selective logging of the swamp hardwood overstory probably would effect it little. Clear cutting might raise the flood level to a dangerous degree.

Drainage of the swamps it frequents would eliminate the species. No comments are available as to whether livestock browse the twigs. In fact little recent information is available. In 1949 Steyermark commented that material he borrowed from the four largest U.S. herbaria contained a total of only 19 herbarium sheets comprising but 10 different collections with most of these made more than one hundred years earlier.

References

Small, J. K. 1933. Manual of the Southeastern Flora. 924.

Steyermark, Julian A. 1949. Lindera Melissaefolia.
Rhodora 51, no. 608: 153-162.

Tucker, G.E. 1974. Lindera mellissaefolium in Arkansas. Rhodora 76:525.

SPECIES: #99 Lindera melissaefolium (Walt.) Blume. Jove's-fruit

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X				
Damage			X			X		
No Lasting Effect	NA				X		NA	?
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Lindera melissaefolia (Walt.) Blume



LAURACEAE

Persea humilis Nash. Dwarf red bay persea; redbay persea
P. borbonia (L.) Spreng. var. humilis (L.) Kopp

Technical Description

Evergreen shrub or small tree with pungently aromatic twigs and foliage.

Stems.--The ascending primary branches numerous and rebranching from near the base, thus the plants bushy with full crowns. Twigs slender but stiffish, reddish, densely appressed-hairy. often lustrous.

Leaves.--Spreading or ascending on angled, appressed-hairy petioles to 2 cm long, the blades lanceolate to elliptic or (rarely) obovate, mostly 4-10 cm long, acute but the tips narrowly rounded, the margins slightly revolute and cartilaginous edged, entire, the bases cuneate, the upper surface yellow-green and smooth, shining, the lower surface lustrous, reddened or bronzed with minute, appressed hairs.

Inflorescence.--Flowers clustered in umbel-like tight cymes, the pedicels silky hairy, the cymes on stiffish, ascending, hairy stalks on new shoots.

Flowers.--Sepals 6 in 2 series, the surfaces silky-hairy. Outer sepals 3, joined at base, ascending about 2 mm long, ovate; inner sepals more spreading, oblong, ca. 3.0-3.5 mm long, yellowish-green. Stamens usually 9, more or less erect, the filaments hairy, the anthers with 4 valves (flaps). Staminodes fleshy. Ovary 1, superior with a single style and stigma button.

Fruit.--Drupes broadly ovoid or (mostly) globose, nearly black when ripe and with a slight bloom, about 1 cm. long.

Distribution and Flowering Season

Sandhills scrub, peninsular Florida, particularly in the central highlands with outliers north as far as southern Georgia. Flowering mostly in early summer, but intermittently all year.

Habitats and Management Implication

This species is part of the sand-pine evergreen scrub oak forest type and is therefore found on deep, fine-textured sands these very often what remains of ancient dunes. Occasionally it is also to be found, with Ceratiola, in open stands of longleaf pine-turkey oak. Associated shrubby species are shrub heaths (Lyonia) hollies, Ceratiola, palmetto, shrub oaks. Evergreen oaks, Florida hickory, Osmanthus, and sand pine mark the overstory where it is present. The sandhills it frequents have historically been subjected to fire, but not as frequently as the often adjacent longleaf pineland. In any event, most of the scrub species, of which this is a part, respond by prolific sprouting and often increase in contrast to the sand pine and Ceratiola which have to reseed such burned areas (the former through opening of charred, serotinous cones).

Clear cutting of the pine in the overstory without disturbance of the sub-stratum would increase this species and other non-commercial scrub evergreens. Root plowing, chaining, windrowing and other methods of site preparation for

pine would of course eliminate scrub species such as P. humilis. Burning is not recommended in this forest site type.

The taxonomic distinctness of this species has long been debated, many workers considering it but a variety of P. borbonia. Current work involving study of epidermal characters together with flavonoid analysis done by Dr. E. P. Wofford support the thesis that it is a taxon distinct from, though perhaps derived from, P. borbonia in recent geologic time.

References

1. Small, J. K. 1933. Manual of the Southeastern Flora. 921-922.
2. Wofford, E. P. 1974. The systematic significance of flavonoids in Persea of the southeastern United States. Biochem. Syst. and Ecol. 2 88-91.
3. _____ 1975. An SEM study of leaf surface pubescence in the southeastern taxa of Persea. With R. W. Pearman, Sida 6 (1): 19-23.

SPECIES: #100 Persea humilis Nash, Redbay persea

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect	NA							??
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Persea humilis Nash



LAURACEAE

Litsea aestivalis (L.) Fern. Pond spice; pond bush
Glabraria geniculata (Walt.) Britton

Technical Description

Glabrous, deciduous shrub to 3 meters tall.

Stems.--The twigs slender, pale-brown, zig-zag, the branches spreading, the bark of new shoots reddish-brown, sometimes tomentose at first.

Leaves.--Alternate, spreading on short slender petioles 5 mm long or less, the blades leathery (somewhat like small leaves of willow-oak), lanceolate to oblong or oblanceolate, mostly 1.5-4.0 cm long, rarely wider than 1.0 cm the tips acute to narrowly or broadly rounded, the margins entire, slightly thickened, the bases acute or acuminate, yellow-green and smooth save for villosity (spreading, long, crisped hairs) along the midrib beneath (sometimes also on the petiole). Winter buds ovoid, valvate, to about 3 mm long, stalked, solitary or paired at the branch tips or from spur tips, these expanding to form cup-like involucre below the small umbels of male or female flowers.

Flowers.--With mostly 6, spreading, yellow sepals, these broadly elliptic-oblong or obovate ca. 3.0-3.5 mm long. Stamens mostly 9, the anthers with 4 valves (flaps), opening inward or laterally. Female flowers with 1 superior ovary, this surrounded by usually 9 short, fleshy staminodes.

Fruit.--One to four, on stalks (pedicels) to 4 mm long, these jointed to peduncles (inflorescence stalks) about as long; body of drupe nearly round, 4-6 mm long, minutely roughened, red.

Distribution and Flowering Season

Bay heads, edges of sandy sinks, meteor ponds, and pocosins, very uncommon, in the Coastal Plain from North Carolina south to northern Florida and southwestern Georgia.

Special Identifying Features

Superficially similar to Lindera spp. but differing in having 4 anther flaps (versus 2 for Lindera), in its smaller, rounder fruit, and in its much smaller and more leathery, narrower leaves. The twigs and foliage lack spicy odor.

Habitats and Management Implication

This is definitely a species of wet, sandy or peaty, quite acid soils. Like Lindera, it may form thickets and thus, while spotty in distribution, may be abundant locally. Common associated woody species would be Red Bay, Virginia Bay, Gallberry, Myrtle, various heaths, Pond Pine, Pond Cypress, Loblolly Bay. Clear cutting of the mercantile species would probably favor this plant. Burning would not effect it adversely in that, like most species of bogs and pocosins, it would respond vigorously with new shoots. Site preparation involving removal of brush would of course eliminate it, unless done in strips. Greatest difficulty for a species with high soil moisture requirements such as this one is through drainage of the habitat.

References

Small, J. K. 1933. Manual of the Southeastern Flora. 921, 923.

Britton, N. L. & A. Brown. 1913. Illustrated flora of North eastern U. S. Canada & British Possessions. Vol. II: p. 135.

Fernald, N. L. 1945. Botanical specialities of the Seward Forest and adjacent areas of Southeastern Virginia. Rhodora 47: 94-142.

SPECIES: #101 Litsea aestivalis (L.) Fern. Pond spice; pond bush

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X			X		
No Lasting Effect	X							?
Beneficial if Done Properly					X			

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Litsea aestivalis (L.) Fern.



ASTERACEAE

Aster plumosus Small; plumose aster; Aster

Technical Description

Perennial herb, from a round, knotty caudex.

Stems.--The stems wand-like, to a meter or more long, ascending, arching or even sprawling on other vegetation; epidermis of lower stem grayish, with shallow, vertical, pale brown cracks, the upper stem reddish-brown or tan, puberulent with pale spreading hairs.

Leaves.--Lower leaves absent by flowering time, those of mid and upper stem numerous, alternate, sessile, rigid, the largest lowest, mostly elliptic-oblong or lance-oblong, about 1-2 cm long, erect, spinulose-tipped, the margin scabro-ciliate, the surfaces villous-puberulent with incurved hairs. Stem leaves gradually smaller upward on the stem, grading into the involucre bracts.

Inflorescence.--Heads numerous, close-set or scattered along the upper part of the stem on short, ascending, pilose-puberulent lateral branches or solitary on short and short-bracted laterals (thus the whole inflorescence rather narrow). Involucres broadly turbinate, about 1 cm. across, the numerous bracts in several, loosely appressed series; involucre bracts linear, acuminate, pale green with purplish tips, these usually somewhat spreading, the surfaces covered with longish, pale, soft hairs.

Flowers.--Ray corollas about 10-12, the blades lineal, spreading, showy, a deep blue-violet, the ray florets about 1.5 cm long. Disc flowers yellowish.

Fruit.--Akenes oblong, about 2 mm long, ribbed lengthwise, densely silky-hairy with erect hairs; pappus about 5 mm long, capillary, yellowish-white.

Distribution and Flowering Season

This aster is found in deep sands of longleaf pine-deciduous scrublands in northwestern Florida, particularly above the Apalachicola River and associated drainages; flowering September through November.

Special Identifying Features

Taxonomically it most closely resembles the common upland aster, A. concolor L. which is like it in habit, leaf, ray flowers and akene, but which has somewhat broader involucre bracts that tend to be more tightly imbricated and having shorter hairs. In fact, the status of this as a species distinct from A. concolor could be questioned.

Habitats and Management Implication

A. plumosus is most often found, as mentioned above, in longleaf pine-deciduous scrub oak woods, and invariably on deep, dryish to moist sands. Its maintenance and increase is related to periodic burning and therefore fire protection, encouraging increase of overstory, would tend to reduce its

numbers. It will occupy areas that have been clearcut of pine and subsequent scarified and will persist in such areas, growing between the planted or seedling pines, until such time as the crowns close.

References

Small, J. K. 1924. Plant novelties from Florida. Bull. Torr. Bot. Club.
51: 379-393

_____. 1933. Manual of the southeastern flora, p. 1384.

SPECIES: #103 Aster plumosus Small, Aster

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								?
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Aster plumosus Small



ASTERACEAE

Brickellia cordifolia Ell. Flyr's brickell-bush; N.C.N.
Coleosanthus cordifolius (Ell.) Kuntze

Technical Description

Erect perennial herb from an erect, cylindrically thickened rhizome (caudex).
Stems.--Solitary or few, erect or ascending, unbranched, mostly 1.0-1.5 meters tall, terete, longitudinally many-low-ribbed, puberulent.

Leaves.--Confined to stem, the lowest gone by flowering time, the largest at midstem opposite, spreading on slender long petioles, mostly triangular, mostly 6-10 cm long, acuminate, the margins crenate-dentate, the bases broadly rounded or truncate, short-attenuate to the petiole; upper surface of blade dark green, smoothish; lower surface puberulent and gland-dotted.

Inflorescence.--Rather few-headed, either a single cyme or a cluster of a few cymes, the puberulent peduncles stiffly erect or ascending, the bracts few, mostly lanceolate. Heads exclusively discoid, broadly top-shaped, 1.5-2.0 cm broad, the bracts in several, loosely overlapping series, the outer few shortest, narrowly or broadly triangular, the inner larger ones larger ones narrowly oblong, 6-8 mm long, strongly parallel-ribbed, obtuse to acuminate, the margins and backs with small wooly hairs. Receptacle of head slightly elevated.

Flowers.--Disc florets very many, tubular, the corolla base whitish, toward the tip purplish, the corolla lobes low-triangular, slightly spreading.

Fruit.--Akenes cylindrical or slightly compressed, about 5 mm long, strongly ribbed, brownish, puberulent; pappus of many, purplish-brown, upwardly-barbellate bristles, these projecting above the tips of the bracts.

Distribution and Flowering Season

Rich sandy loamy soil of high hammocks in the Coastal Plain, Georgia south to peninsular Florida and west into southern Alabama. Flowering from August to October.

Habitats and Management Implication

This species is to be looked for on well-drained fine sandy loams, usually in mature forest of upland hammocks. The overstory is usually comprised of a mixture of pines such as P. taeda, P. glabra with hardwoods such as live-oak, willow-oak (complex), beech, magnolia (M. grandiflora), etc. Frequent in the understory would be such shrubs as Myrica cerifera, Vaccinium spp., Rhododendron (particularly canescens), Osmanthus, Kalmia, Sebastiania, Arundinaria. In foliage and in general appearance of the plant, it mostly closely resembles the "Snake-root" type of Eupatorium, and is often in association with two of these species.

Selective logging of the pine-mixed hardwood overstory would probably not create an adverse situation for this species of open woodlands. Heavy logging

on the other hand would tend to produce a scrub or shrub response that might provide a problem in competition. Clear cutting and mechanical site preparation for row crops of pine would eliminate this species by changing the habitat. Pine plantations are devoid of this plant and most other high mixed-hammock species of forbs.

References

Small, J. K. 1933. Manual of the Southeastern Flora: 1328.

SPECIES: #104 Brickellia cordifolia Ell. N.C.N.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage	(NA) X					X		X
No Lasting Effect								
Beneficial if Done Properly					X			

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Brickellia cordifolia Ell.



ASTERACEAE

Cacalia diversifolia T. & G.; variable-leaved indian-plantain; Indian-Plantain
Mesadenia diversifolia (T. & G.) Greene

Technical Description

Smooth perennial herbs with thickened roots from a short-thickened erect caudex.

Stems.--Usually single, simple (unbranched) below the inflorescence, stiffly erect, coarsely angled, purplish-tinted, bolting from an overwintering rosette of long-petiolate, ovate, coarsely toothed or shallowly lobed leaves.

Leaves.--Several toward the stem base, scattered upward alternate, the lowest largest, long-petiolate, the upper short petiolate or nearly sessile, the largest blades 10-15 cm long, ovate, acute, the margins from sinuate and distantly dentate to shallowly triangularly lobed, the bases abruptly attenuated to the winged petiole. Rosette leaves similar.

Inflorescence.--A many-headed flattish-topped or concave cyme, the branches of which arch upward from the upper stem nodes. Heads narrowly bell-shaped or cylindric, the bracts in 1 series, linear with a winged midrib, yellowish or greenish-white.

Flowers.--Corollas all discoid, the corolla lobes linear, pale or bright lavender.

Fruits.--Akenes fusiform, 4-5 mm long, dark brown, inconspicuously ribbed and somewhat flattened, the pappus of fine white bristles about as long as the akene body.

Distribution and Flowering Season

Banks of streams through low hardwood hammocks, from southeastern Alabama and southwestern Georgia southward through west Florida into northwestern peninsular Florida. Flowering from late May through June. August.

Habitats and Management Implication

This Cacalia is always on sandy-silt or muck in river bottom woodlands. It particularly abounds where there are natural or artificial clearings in such woods, there forming almost pure stands, its large cymes of whitish heads making a conspicuous sight. Common associated species of herbs are Juncus spp., Sagittaria spp., Scirpus cyperinus, S. divaricatus, Peltandra virginica. In the overstory are Betula nigra, Nyssa aquatica, N. biflora, Fraxinus caroliniana, various oaks, particularly Q. lyrata, Q. michauxii, various willow oaks, Carya aquatica, Liquidambar, and occasional Taxodium. It is usually in bottoms that overlies massive limestone.

Selective logging of the bottoms frequented by this species would likely favor its increase through creation of small openings that would admit the partial light it needs. Heavy logging of the same areas would likely increase other herbaceous or shrubby vegetation to competitive disadvantage. Also, while this species is in bottoms, it is not favored in situations where water

covers the ground through the entire season. Heavy logging of such bottoms often results in a rising of the water table and subsequent flooding out of some bottomland species such as this.

References

Small, J. K. 1933. Manual of the Southeastern Flora, pp. 1475-1476.

Kral, R. and R. K. Godfrey. 1958. Synopsis of the Florida species of Cacalia (Compositae). Quart. Journ. Fla. Acad. Sci. 21 (3): 193-206.

SPECIES: #105 *Cacalia diversifolia* T. & G. Indian-Plantain

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X		X		
Damage								
No Lasting Effect	NA							
Beneficial if Done Properly					X			

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Cacalia diversifolia T. & G.



ANNONACEAE

Deeringothamnus pulchellus Small; slimpetal pawpaw; N.C.N.
Asimina pulchella (Small) Rehder & Dayton

Technical Description

Similar in root stock, stem, leaf and fruit to Deeringothamnus rugelii, differing only in its narrower petals which are more recurved, and in its white to pale pink flower color. The odor of the flower is faint but very pleasant.

Distribution and Flowering Season

Similarly rare, this shrub is found only toward the coast in southwestern peninsular Florida, mostly in Lee and Charlotte counties. It is probably most abundant on Big Pine Island near Fort Myers.

Habitats and Management Implication

It is always in open stands of slash pine with the woody understory being mostly saw palmetto, together with some Lyonia, Asimina, ground oak, etc. As is the case with D. rugelii this is a plant of high hydroperiod sandy soils and its response to logging and site preparation methods is the same.

References

- Kral, R. 1960. A revision of Asimina and Deeringothamnus (Annonaceae)
Brittonia 12 (4): 233-278
- Rehder, A. and W. Dayton. 1944. A new combination in
Asimina. Journ. Arn. Arb. 25: 84.
- Small, J.D. 1924. Plant novelties from Florida. Bull. Torr. Bot.
Club 51: 390.
- _____. 1926. Deeringothamnus pulchellus. Addisonia 11: 33-34,
pl. 369.
- _____. 1933. Manual of the southeastern flora, pp. 531-432. Chapel Hill.

SPECIES: #109 Deeringotharmus pulchellus Small, N.C.N.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								
No Lasting Effect		X	X	X				X
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Deeringothamnus pulchellus Small



ANNONACEAE

Deeringothamnus rugelii (Robins.) Small; Rugel's
pawpaw; N.C.N.
Asimina rugelii Robins.

Technical Description

A low, sparingly branched, pungent-smelling shrub, rarely to 0.5 meters tall, from a stout taproot.

Stems.--Shoots slender, pale brown, smoothish, arching or erect, seldom branched.

Leaves.--Alternate, erect, leathery but deciduous, to 7 cm long but mostly around 4 cm, mostly oblong, blunt, entire and slightly inrolled, on very short stalks, smooth, dark green above, paler and raised-net-veined beneath.

Inflorescence.--Flowers solitary in leaf axils, spreading or nodding on slender stalks.

Flowers.--Sepals 3, oblong, about 1/2 cm long, green. Petals 6, nearly equal, narrowly oblong, about 1.5 cm long, canary yellow. Stamens many, in flat-topped cluster shorter than the petals. Carpels spindle-shaped, several, ripening into usually 5, peanut shaped berries.

Fruit.--Berries smooth and yellow-green when ripe and between 3 and 6 cm long. Seeds about the size and shape of brown beans.

Distribution and Flowering Season

This rare shrub occurs naturally only in northeastern peninsular Florida (Volusia, Seminole, Cos.). It blooms erratically from April throughout the growing season.

Habitats and Management Implications

D. rugelii is always found in slash pine-saw palmetto flatwoods on deep, fine-textured, poorly drained sands or sandy peats. Commonly its shrubby associates are Befaria, Lyonia ferruginea, L. lucida, Vaccinium and Ilex of the gallberry group. Wiregrass, Panicgrass, and Andropogon, together with several sedges, Eriocauls and xyrids are common herbaceous associates.

It is mostly found in the semi-shade of slash pine woodlands, frequently in areas where logging of this plant is extensive, and its increase may be favored where natural regeneration is allowed. Clear cutting, if the natural understory is not disturbed, would not effect it. Ground fires tend to increase it, the plants actually losing ground during long periods of no fire and being stimulated to produce vigorous flowering shoots from their large storage roots by fire. Any site preparation method that would involve shearing at the ground level would tend to increase it, having an effect similar to fire in reducing competition. Discing has been demonstrated to increase this sort of species in that new shoots can arise adventitiously from the cut roots, but deep plowing or mounding or the bulldozing of all

vegetation into windrows would eliminate the species. Drainage would ultimately remove it, as it is high hydroperiod dependent. Grazing has little effect, in that cattle find this shrub unpalatable.

In nature this species is fire dependent, thus any sort of management that would exclude fire would at the same time encourage the competitive shrub and herbaceous vegetation to take over.

References

Gray, A. and S. Watson. 1895 Asimina in Synoptical Flora of North America, Vol. I, Pt. 1, p. 64.

Kral, R. 1960 A revision of Asimina and Deeringothamnus (Annonaceae). Brittonia 12 (4) 233-278

Robinson, B.L. 1897. Suppl. Syn. Flora of North America, Vol. I, Pt. 1, p. 465

Small, J.K. 1930. Deeringothamnus rugelii. Addisonia 15: 17-18; pl.

SPECIES: #110 Deeringotharmus rugelii (Robins.) Small. N.C.N.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								
No Lasting Effect		X	X	X				X
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Deeringothamnus rugelii (Robins.) Small



APIACEAE

Eryngium cuneifolium Small, Wedge-leaved button snake
roots; eryngos or button-snake roots

Technical Description

An erect smoothish perennial herb to 1/2 meter tall, the foliage aromatic, from a woody, elongate, stoutish rootstock.

Stems.--One to several, spreading ascending or erect, round in cross section but with several distinct longitudinal ribs.

Leaves.--Basal leaves in strong tufts, long-stalked, the blades wedge-shaped, ca. 4 cm long, divided above into 3-5 apical, thick-margined, bristle-tipped teeth. Stem leaves numerous, spreading-ascending, also with bristle-tipped teeth, gradually lessening in size to the flower clusters.

Inflorescence.--Flowers in bristly-looking heads, these mostly greenish-white, later tinged with pale blue, each head about 0.7-1.0 cm broad, on a stalk about as long or longer, in open, cymose clusters, and each with an involucre of spreading, usually 3-segmented, bristle-tipped bracts, these spreading and thus involucre broader than heads, greenish, or greenish-white. Surface of receptacle of head elevated, flowers many, each with a 3-segmented, greenish white, sharp-tipped bract.

Flowers.--Sepals 5, linear, about 2 mm long, erect, thick-margined, sharp-tipped, pale blue with tints of green and white; petals 5, erect, narrow, pale blue with tints of white, about as long as the sepals; stamens 5, anthers yellowish-white; ovary inferior, with a pebbly or warty surface, broadly obovate or round, about 1.5 mm long in fruit.

Distribution and Flowering Season

This species occurs naturally in the few counties of the southern Central Highlands of peninsular Florida, in what is called the lake region. It is locally abundant on the deep, fine-textured white sands of the scrub-forested sandhills of that region, and blooms from July to January.

Habitats and Management Implications

The area is largely forested with sand-pine and evergreen scrub oak, mixed with shrubby members of the holly family, the heath family (particularly Lyonia), and palmetto species, various Polygonella. In areas where the scrub and overstory pine is cut away, such species as this Eryngium will spread. They also increase after heavy burns have cut the overstory and understory competition, probably because of the durable, large, subterranean rootstocks. Reproduction by seed is heavy. Mechanical disturbance of the sort brought about by heavy logging, even scraping away of surface shrubby vegetation, provides sandy clearings that promote such species. Heavy development of overstory pine tends to reduce it.

The greatest hazard the species probably faces at present is land development for housing. The plant itself is not high priority grazing, its major damage from cattle would be from trampling.

References

Small, J.K. 1933. Manual of the Southeastern Flora: p 964, Chapel Hill.N.C.

Mathias, Mildred E. and Constance, L. 1941. American Midland Naturalist
25: pp. 361-387.

SPECIES: #111 Eryngium cuneifolium Small. Eryngos or button-snake roots

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy				X			X	
Damage		X	NA					
No Lasting Effect								?
Beneficial if Done Properly	(NA) X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Eryngium cuneifolium Small



SPECIES: #111 Eryngium cuneifolium Small. Eryngos or button-snake roots

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy				X			X	
Damage		X	NA					
No Lasting Effect								?
Beneficial if Done Properly	(NA) X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Eryngium cuneifolium Small



AQUIFOLIACEAE

Ilex amelanchier M.A. Curtis. Service berry holly; holly

Technical Description

Tall shrubs, mostly 2-3 (-4) meters tall, with few to several erect or ascending stems from the root.

Stems.--The bark tight, smooth, gray-brown. Twigs slender but stiffish, spreading or ascending. seldom forming spur-shoots, the bark of new shoots mostly gray-brown, at first with scattered pale puberulence, later that season smooth and with a scattering of pale lenticels.

Leaves.--Deciduous, alternate, estipulate, oblong, elliptic, ovate or narrowly obovate, mostly 4-10 cm long, acute, rounded or short-acuminate, the margins toward the base usually entire, toward the apex ascending-low-toothed, the bases mostly broadly rounded on slender, spreading, puberulent stalks to 1.2 cm long; upper surface smoothish, dark green; lower surface rather rugose, villous-puberulent.

Inflorescence.--Flowers solitary or in small, short-stalked, cymes, the slender puberulent pedicels to 1 cm long.

Flowers.--Female flowers with 4-5 tomentulose, triangular sepals and the same number of oblong, whitish petals ca. 3.5 - 4.0 mm long, in full bloom in April.

Fruit.--Maturing in September, round, fully 1 cm broad on stalks to 1.5 cm long, the skin a deep, opaque red, the seeds (mericarps) with the outer face sharply few-ridged.

Distribution and Management Implication

Banks of streams through pine flatwoods, hardwood hammocks, titi swamps, and bogs, lower Coastal Plain, southeastern North Carolina southward to northern Florida, thence west into the Florida parishes of Louisiana.

Special Identifying Features

This rare species has fruit of a size and color comparable to Ilex opaca, largish leaves comparable to those of I. montana on twigs similar to those of I. ambigua. Its staminate flowers arise from a common peduncle (stalk) unlike those of related species.

Habitats and Management Implication

Management of the low forest or savanna I. amelanchier frequents if it involved selective logging of the hardwood and pine overstory complex would probably effect this species very little. However, it is definitely a part of a high hydroperiod complex of woody plants, so that any scheme involving drainage would eliminate I. amelanchier along with its associates such as Myrica, Ilex myrtifolia, Cyrilla, Cliftonia, Persea and Magnolia virginiana.

References

Chapman, A.W. 1860. Flora of the southern U.S.: 270. Cambridge, Mass.

Small, J.D. 1933. Manual of the southeastern flora, pp. 813-815. Chapel Hill, N.C.

SPECIES: #114 Ilex amelanchier M. A. Curtis Holly

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X				
Damage						X		
No Lasting Effect	NA							
Beneficial if Done Properly					X			

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Ilex amelanchier M.A. Curtis



AQUIFOLIACEAE

Ilex opaca L. var. arenicola (Ashe) Ashe. Sand-
loving American holly; Holly
I. cumulicola Small

Technical Description

Shrub or small tree, rarely reaching 20 feet and a d.b.h. of 8".

Stems.--The bark smooth, thin, tight, pale gray, the crown narrowish or broad, of usually ascending branches. Twigs with older bark gray, that of newer shoots gray or reddish-brown, stoutish, stiff, somewhat angulate. Buds ovoid-triangular, about 3-4 mm long, imbricate, the few scales reddish-brown, gray-appressed-hairy.

Leaves.--Persistent, alternate, mostly ascending on short, stiffish, puberulent stalks, the blades rarely longer than 6 cm long, oblong or obovate, rarely entire, more often with 3-4 pairs of strong, ascending spines above the middle, the margins strongly revolute the upper surfaces lustrous, yellowish-green, the lower surfaces paler, more yellowish.

Inflorescence.--Trees unisexual, the male flowers small, in small clusters on wood of the previous year, the female similar but in smaller clusters (solitary or up to 3).

Flowers.--Sepals of female flowers forming a 4-5 low-toothed cup, the margins entire of low-ciliate.

Fruit.--The largest of our hollies, on stout, puberulent stalks shorter than themselves, round, often fully 1 cm broad, a deep, opaque red when ripe, the nutlets (like hard segments of an orange) with backs having several low, rounded ridges.

Special Identifying Features

The var. arenicola is distinguished from var. opaca mostly by the more yellowish tints of the foliage, by the more ascending, more revolute leaves, the spines of which are directed forward, by the somewhat larger fruit, and by the less sharply ridged pyrenes (seeds, nutlets).

Distribution and Flowering Season

This small tree, blooming in late spring and early summer, is a component of the Sand Pine-evergreen scrub of the peninsular Florida highlands, and was most abundant there in the southernmost part of the highlands. Kurz and Godfrey (1962) indicate that it occurs occasionally in high sandy scrub in northeastern Florida, yet this may be a part of an extreme of I. opaca var. opaca. The same argument exists as to the northern limits of Osmanthus megacarpa, Carya floridana and other scrub trees comprising species pairs with more wide-ranging sclerophyllous species. The taxonomy is still not resolved.

Habitats and Management Implication

I. opaca var. arenicola in the strict sense has had a range that coincides fairly closely with the hardiness zone for citrus. Therefore, much of its former area has been converted to row culture of citrus and more is being converted annually. This, and the continuing conversion of south Florida highlands to retirement estates and other housing, make up the greatest hazard to the species. It was never abundant, never a stand former, but rather a minor element of the scrub. Its continuance is further risked by the dioecious character of the species, and the handsome foliage and fruit which makes it subject to vandalism.

References

Small, J.K. 1929. Plant novelties for Florida. Bull. Torr Bot. Club
51: 379-393.

Small, J.K. 1933. Manual of the Southeastern Florida Flora, p. 816. Chapel Hill, N.C.

SPECIES: #115 Ilex opaca L. var. arenicola (Ashe) Ashe; Holly

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy								
Damage							X	
No Lasting Effect	NA	—————→						
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Ilex opaca L. var. arenicola (Ashe) Ashe



ASTERACEAE

Echinacea laevigata (Boynt. & Beadle) Blake. Cone-flower
Brauneria laevigata Boynt. & Beadle in Small
Echinacea purpurea var. laevigata (Boynt. & Beadle) Cronq.

Technical Description

Tall glabrous perennials from stout, erect, simple or branched rhizomes.

Stems.--Up to 1.5 meters tall, rarely (then sparingly) branched, stiffly erect, terete or somewhat angled, below greenish-brown or purplish-tinted, above greenish or purplish.

Leaves.--Rosette leaves or offshoot leaves largest, long-petiolate, with lanceolate or narrowly ovate blades to 15 cm long, apices acute, margins entire or distantly low-toothed, the bases attenuate to petioles nearly as long as or longer than blades, these clasping-based. Lower stem leaves approximate, similar to rosette leaves, those of mid-stem and above increasingly smaller, shorter petioled, more distant, the upper part of the stem forming an elongate, naked peduncle.

Inflorescence.--Heads short-conic, mostly 2.0-2.5 cm broad, usually solitary at peduncle tip, or occasionally stems producing 2-3 additional, erect peduncles. Bracts of involucre several, greenish, the bases imbricated in several series, the acute tips spreading or recurved. Surface of receptacle conic, covered with abundant, erect, smooth, linear, sharp, purple-tipped chaff (pales), each pale keeled, partly enfolding the base of a flower, the whole head looking bristly.

Flowers.--Ray flowers with rays mostly 6-7 cm long, lineal, pale purple, spreading downward. Disc flowers with corollas tubular, purple, about 5 mm long, the teeth mostly erect, short-triangular.

Fruit.--Akenes oblong-prismatic, usually 4-angled, gray-brown, about 4-5 mm long, the pappus a low, thin crown of triangular teeth.

Distribution and Flowering Season

Meadows, open woodlands, glades, usually over calcareous parent material, southwestern Virginia (Valley & Ridge, Blue Ridge and Piedmont) southward to northeastern Georgia; reported from northeastern Alabama.

Special Identifying Features

Taxonomically this is closest to the common eastern purple cone-flower E. purpurea, but is by comparison smooth, with longer and narrower ray corollas. The awn of the chaff is usually 1/4 as long as the pale body, while that of E. purpurea is longer, mostly 1/2 as long as the pale body. E. purpurea also tends to be a more robust plant with somewhat larger heads and a less erect rootstock.

Habitat and Management Implications

This species forms small stands in open, grassy woodlands. My own experience with it has been in low-grade upland hardwoods such as mixed oak-hickory-juniper where it occupies small clearings. Selective removal of the trees would little alter the habitat and in fact would promote the development of glade plants such as this. Burning (not recommended for this sort of forest) would probably not harm these plants in that they are cormophytes. Conversion to grazed woodlot would not favor the species in that it is taken by cattle or sheep, yet gastroenteritis is reported from the ingestion by cattle or sheep of Rudbeckia, a closely related genus. It is possible that the plants are lost from grazed habitat more because of mechanical damage to them by trampling. Woods fires favor the increase of this species.

References

- McGregor, R. L. 1968. The taxonomy of the genus Echinacea (Compositae). Univ. Kansas Sci. Bull. XLVIII (4): 113-142.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1420-1421. Chapel Hill, N. C.

SPECIES Echinacea laevigata (Boynt. & Beadle) Blake. Cone-flower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy							X	
Damage		NA	NA	NA				X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Echinacea laevigata (Boynt. & Beadle) Blake



ASTERACEAE

Helianthus carnosus Small. Lake side sunflower;
sunflowers

Technical Description

Perennial herb from a short caudex, the roots fleshy, increasing by short lateral offshoots, these forming overwintering rosettes.

Stems.--One to few, to a meter long, erect or with bases slightly arching to the root, round in cross section or low-ribbed, reddish brown, glabrous or with a few distant multicellular hairs toward the tip.

Leaves.--Rosette and lower leaves lineal, mostly elliptic-linear, oblanceolate-linear, or spatulate, mostly 8-15 cm long, rarely more than 1.5 cm broad, obtuse to acute, sometimes callus-tipped, the margins entire, the base attenuate to a short petiole or sessile, the surfaces smooth, yellow green, and only the mid-rib evident. Stem leaves ascending, scattered, the lowest opposite, progressively shortening and narrowing upward, sessile, the uppermost ones the most distant and the very upper decimeter or so of stem naked.

Inflorescence.--Heads usually solitary or 2 at the stem tip, about 3 cm broad across the phyllaries, up to 8 cm broad from ray tip to ray tip. Phyllaries firm, flat, but loosely imbricated, the longest about 1.5 cm or less, mostly narrowly ovate, oblong or lanceolate, with acuminate to spinulose tips, entire, glabrous, mostly 5-nerved. Receptacle slightly elevated, the chaff strongly bowed at base, strongly nerved, acuminate, yellowish, smooth or minutely and distantly spreading-puberulent.

Flowers.--Ray corollas spreading, bright yellow. Disc corollas a deeper, dull yellow, narrowly funnelform from a short, sometimes puberulent tube.

Fruit.--Akenes oblong-prismatic, somewhat narrowed proximally, about 4 mm long, somewhat compressed in a plane parallel to the head center, bearing 2-4 narrow, chaffy deciduous scales but at maturity subtruncate, or with a pair of low thick teeth, smooth, gray-brown.

Distribution and Flowering Season

This species is restricted to northeastern Florida and flowers in late summer and fall.

Special Identifying Features

In size and general aspect from a distance it resembles Helianthus heterophyllus Nutt., but that sunflower has a purplish brown disc and a scabrous stem and leaf.

Habitats and Management Implication

H. carnosus is found in moist to wet low pineland savannas, typically on black highly organic sandy peats and always in clearings.

The commonest associate species are typical of bogs and low savannas, being mostly grasses, sedges, Lycopodium, Sarracenia, Xyris, Agalinis. In nature it is probably maintained by fire such as would eliminate or reduce overstory species such as slash pine, longleaf pine and gums, and shrub understory such as gallberry, palmetto, bay. Thus clear-cutting would probably favor increase of this species; controlled burning certainly would favor it. So as well would any program that would reduce the shrub and palmetto layer and favor the increase of the grass-sedge community this species is part of. However, the pinelands in which H. carnosus grows are often being block cut, this followed by site preparation involving drainage which would eliminate all high hydroperiod soil grasses and forbs. I have seen the plants in slash pine plantings, again in areas where cleared areas are allowed to seed in with pine, but it does not seem to persist when the stand closes. I have observed it in pastured clearings and open pastured woodlands only where protected along fences.

References

Heiser, C. B. et al. 1969. The North American sunflowers (Helianthus). Mem. Torr. Bot. Club 22 (3): 1-218.

Small, J. K. 1902. A sea beach Helianthus from Florida. Torreyana 2: 74.

_____ 1933. Manual of the Southeastern Flora: p 1436. Chapel Hill, N.C.

SPECIES: #120 Helianthus carnosus Small. Sunflowers

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Do not drain.

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Helianthus carnosus Small



DROSERACEAE

Dionaea muscipula Ellis.; Common venus' flytrap;
Venus'-flytrap

Technical Description

Perennial, smooth, forming rosettes mostly 1.0-1.5 dm across from shallowly set "bulbs" made up of fleshy scale leaves, this bulb with a shallow diffuse root system.

Leaves.--Rosette leaves to 15 cm long, spreading in all directions from the contracted stem, numerous and spirally close-set; petioles green, mostly spatulate, flattened, with broad clasping bases, abruptly narrowed above these, then broadening apically and with a short, very narrow constriction just below the blade; blades round when spread, or broader than long (thus reniform), 2-3 cm broad, the midrib acting as a hinge, the edges stiffly long-ciliate, the surfaces green or strongly reddish or maroon tinted particularly on the upper surface, which has a scattering of erect, very slender hairs (tactile hairs).

Inflorescence.--Flowers regular produced few or several in umbel-like corymbs at summits of slender erect scapes to 3 dm long, the flower stalks elongating up to 2 cm subtended by elliptical, narrowly ovate or lanceolate bracts.

Flowers.--Sepals 5, lance-ovate, 5-10 mm long, greenish, with a scattering of minute simple or stellate, somewhat glandular hairs on backs and margins. Petals 5, distinct, cuneate-spatulate, spreading 10-4 mm long, the tips rounded-emarginate, the surface white strongly lined with green (somewhat like Grass of Parnassus); stamens between 10 and 20, usually around 15, distinct, spreading, the filaments slender, 5-7 mm long, the anthers 2-locular, nearly round; ovary superior, of 5 carpels, with 1 chamber, the style slender, tufted-branched at its tip.

Fruit.--Capsule ovoid, to 4 mm long, this irregularly splitting to reveal several black lustrous seeds.

Distribution and Flowering Season

Sphagnous bogs, shores, banks and seeps, Coastal Plain, eastern North Carolina south to northeastern South Carolina. Flowering May, June.

Special Identifying Features

This species, making up a genus, is unique. It is in the insectivorous family Droseraceae and like the related genus Drosera uncoils its expanding leaves as in ferns. Its leaf blades close, beartrap like, around insect "visitors" which produce a stimulus through contacting the slender tactile hairs on the upper leaf surface this communicated to motor cells along the hingelike midrib which

quickly collapse; thus the halves of the blade fold rapidly together, the stiff fringe of cilia interlacing along the closed margins, all this often entrapping the insect. Enzymes are secreted from glands in the leaf, these breaking down the proteins, which are then assimilated.

Habitats and Management Implications

The Venus' Flytrap is a true bog plant, is usually in the full sun of bogs populated by other insectivorous plants, particularly Drosera and Sarracenia, together with a wealth of bog grasses, sedges, orchids and liliaceous species. The bases (bulbs) are shallowly set either in sphagnum or on highly organic black sandy peat wash. The species will not reproduce on substrates other than permanently moist ones, is not very tolerant of shade. Neither does it tolerate much competition in the way of other herbs, particularly taller herbs, grasses or sedges. Best situations for it are sunny "washes" or exposures of moist to wet sandy peat where it and sundews may form small mats of growth. It is commonest in openings in pocosins or in pineland savanna, the pine overstory being mainly longleaf and/or pond pine, the shrub layer being mainly gallberry, Lyonia, Andromeda, Kalmia, Magnolia, Myrica etc. Historically, area was probably maintained for it by periodic burning of the flatwoods and pocosins, thus removal of excess shade and other competing herbs and shrubs. Today, it frequently occupies areas where clearcutting or heavy logging has taken place so long as there are contiguous seed sources; it may also abound where there has been considerable soil disturbance either through site preparation or through road construction. However, it will not persist where pine plantations produce heavy shade nor will it survive the drainage that often accompanies site preparation. Some of the best places to look for it are along the road systems where seepage develops along the road shoulders and ditchbanks, or where wet savanna has been recently burned.

This is one of the most exploited of southeastern plants, large populations being decimated or exterminated for the novelty plant trade. Thus the greatest threats to the species are exploitation, drainage for agriculture or pine plantation, and protection of wet habitat from fire.

References

- Radford, A. E. et al. 1968. Manual of the Vascular Flora of the Carolinas, p. 518. Chapel Hill, N.C.
- Small, J. K. 1933. Manual of the Southeastern Flora, p. 580. Chapel Hill, N.C.

SPECIES: #127 Dionaea muscipula Ellis. Venus'-flytrap

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X (eventually)	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X		X		X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Dionaea muscipula Ellis



ERICACEAE

Rhododendron prunifolium (Small) Millais. Plumleaf
azalea; azalea
Azalea prunifolia Small

Technical Description

Tall shrub, reaching 3 meters, often quite irregularly branched but with branchlets in pseudo-shorls as in the genus.

Stems.--Bark of older shoots mostly gray, smooth, ultimately exfoliating in thin strips, that of new shoots usually reddish-brown, mostly smooth. Overwintering flower-cluster buds narrowly ovoid, the imbricate scales tan, strongly white-ciliate, mucronate.

Leaves.--Fully emerged and hardened by flowering time, spreading on short (3-9 mm) reddish-brown, smooth or sparingly appressed-stiff-hairy shoots, the blades mostly elliptic to obovate or oblanceolate, mostly 4.5-8.0 cm long, acute and mucronulate, ciliate with erect hairs, also minutely serrulate, the bases cuneate, the upper surfaces dark green and smooth except for short, incurved hairs along the midrib, sometimes the lateral veins, the lower surface paler and with longer, appressed hairs along the midrib.

Inflorescence.--Flowers in a cluster few to several, spreading on hirsute, reddish or orangish pedicels to 1 cm long. Calyx a shallow, strongly and broadly-triangularly-lobed cup, the lobes 1.0-1.5 mm long, the backs smooth or stiff-hairy, the margins strongly ciliate with long stiffish hairs.

Flowers.--Corollas nearly salverform, 3-4 cm long, 3.0-3.5 cm broad, deep red, the tube and lobes with a scattering of spreading, glandular weak hairs on the veins. Stamens with reddish filaments projecting far beyond the corolla tip. Style similarly exserted.

Fruit.--Capsule about 2 cm long, cylindrical, usually with a mixture of short-incurved and longer erect hairs.

Distribution and Flowering Season

R. prunifolium is scattered, mostly in beech-maple-magnolia ravines, in southwestern Georgia and southeastern Alabama, along the Chattahoochee River and its tributary valleys. It blooms in July and early August.

Special Identifying Features

The nearest red-flowered azalea-type rhododendrons to it geographically are of species austrinum, from which it is readily distinguished by its much later blooming time, its more glabrous flowers, its even taller habit. Also, the flowers appear well after the leaves.

Habitats and Management Implication

This azalea is in somewhat dry, to moist, but always mesic situations. In the overstory there may be some pines, particularly P. taeda, P. glabra, but much more often beech, white ash, various southern red oaks, signut hickory, hard maple, Southern Magnolia.

Commonly associated shrubs are Kalmia latifolia, Hydrangea quercifolia, Ilicium, Sebastiania, various high-bush blueberries, Symplocos. The soil types it is found on vary from sandy clay loams through fine sandy loams, and (as is true for any soil supporting heaths) are quite acid.

In that this species is primarily one of ravine slopes and the soils of these within the range of the azalea are highly erodable, logging of the overstory species of pines and hardwoods should necessarily be selective. The wreckage and erosion found in areas where clear-cutting has been practiced quite plainly demonstrate that R. prunifolium would be at a distinct disadvantage. Such areas generally go over to weedy shrubs, particularly blackberry, vines such as Smilax, Japanese honeysuckle, and Kudzu (where present), all of which would swamp out the original shrub understory that would have survived the logging operation. It therefore appears that this shrub is maintained only through maintenance of the forest soils and a selectively logged overstory. Such areas are sometimes converted to pasture after logging, again with poor results because sites are too steep and erodable for good pasture. There is no information available as to the toxicity to livestock of the foliage of this species, but toxicologists such as Kingsbury (1964) opine that most species of Rhododendron are to be considered toxic.

This azalea is one with considerable ornamental value, has been cultivated commercially to a limited extent. It is definitely in danger even in places where the habitat is maintained, because of the temptation to vandals and bad amateur gardeners.

References

Small, J.K. 1933. Manual of the Southeastern Flora p997. Chapel Hill, N.C.

Wilson, G.H. & A. Rehder 1921. A monograph of Azalea. Univ. Press, Cambridge. 219 pp.

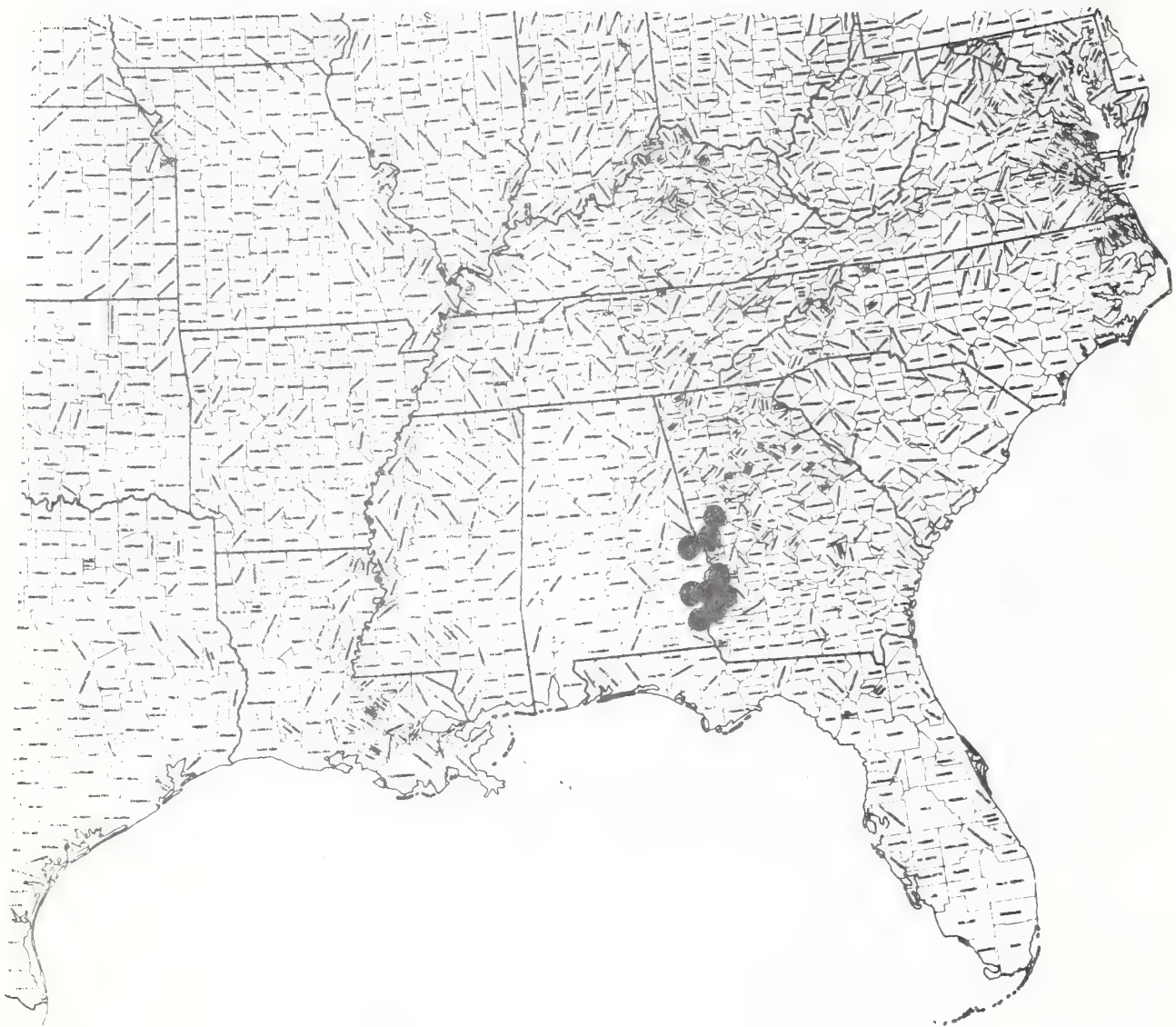
SPECIES: #129 Rhododendron prunifolium (Small) Millais Azalea

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X				
Damage	X (NA)		X			X	X	
No Lasting Effect								
Beneficial if Done Properly					X			

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Rhododendron prunifolium (Small) Millais



FABACEAE

Baptisia calycosa Canby; pineland wild-indigo
or Wild Indigo

Technical Description

Bushy, densely leafy, smoothish, perennial herbs from stout rootstocks.

Stems.--Usually with 1 erect central axis, this pale green, somewhat glaucous between 5 and 10 mm thick, this with several spreading or ascending branches from near the base to the summit, these rebranching from nearly every node to form a roundish dense crown fully as broad as high or broader, the whole plant 5-10 dm tall.

Leaves.--Alternate, trifoliate, near sessile, stipulate, the stipules 1-2 cm long, elliptic linear, elliptic or lanceolate; leaflets 3, oblanceolate, mostly 2-3 cm long, nearly equal, pale yellow green (turning black on drying), obtuse to rounded, the margins entire, ciliate with a scattering of long white spreading hairs, the bases narrowly cuneate, the surfaces smooth or nearly so, very finely reticulate.

Inflorescence.--Flowers arising singly from the axils of simple narrowly ovate or lanceolate bracts, numerous in rather open, elongating racemes on slender spreading-ascending stalks 2-5 cm long, these stalks with a pair of opposite, smaller bracts shortly below the flower.

Flowers.--Calyx in bloom about 1.5 cm long, green, the tube campanulate, about 3 mm long, the lobes unequal, leafy spreading-ascending, broadly oblanceolate, broadly acute, with short uncrossed, usually ciliate, cuneate-based. Petals clear yellow, the corolla about 1 cm long, the standard somewhat shorter than the wings and keel, nearly round, the wings oblanceolate, the keel petals bent upward along the keel. Stamens 10, all filaments distinct, all smooth. Ovary smooth, with a slender, upswept style.

Fruit.--Ovoid, the body with the valve edges forming keels, clasped by the sepals, about 1 cm. long on a stipe about 3 mm. long and with a persistent slender style beak, black when ripe, smooth.

Distribution and Flowering Season

Sandy longleaf pinelands, particularly low sandy rises in pine flatwoods, northeastern Florida. Flowering late June and July.

Special Identifying Features

This particular wild-indigo looks at first glance like B. lecontei in flower and leaf, but its calyx lobes are much larger and foliaceous while those of B. lecontei are no longer than the calyx tube. It is nearest B. hirsuta, a plant of northwestern Florida, in calyx character, but that plant is much more pubescent, the hairs of B. calycosa being confined to the margins of leaflets and sepals.

Habitats and Management Implication

B. calycosa is found always on deep sands, usually amidst a scattering

of longleaf pine, scrub oak (particularly Q. laevis), saw palmetto and associated with numerous dry soil grasses and sedges, particularly Andropogon, Aristida, Panicum (Dichanthelium) Bulbostylis, Cyperus (C. filiculmis, C. retrorsus, C. plukenetii). It may be found in sandy exposures transitional to pine flatwoods. In any event, it is part of longleaf pine savanna or longleaf pine-deciduous scrub oak types, both associations constituting fire disclimax. Within its small range (mostly in Clay, St. Johns counties) it appears to be most abundant and vigorous in recently burned over pinelands, least abundant where forest is heaviest. It will persist in pastures and on the edges of pine plantations. Clear cutting would favor its increase, as would any site preparation which would reduce shrub or tree competition without severely altering the soil. Prescribed burning would of course favor its increase.

References

Lairsey, Mary M. 1940. A monograph of the genus Baptisia.
Ann. Mo. Bot. Gard. 27: 119-224.

Small, J. K. 1933. Manual of the southeastern flora, p. 676.

SPECIES: #130 Baptisia calycosa Canby, False Indigo or Wild Indigo

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X				
Damage			X					
No Lasting Effect							X	X
Beneficial if Done Properly	X				X	X		

Other Comments:

if seed source near some are suspected poisons

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Baptisia calycosa Canby



FABACEAE

Lupinus westianus Small. Panhandle lupine; lupine

Technical Description

Shrubby evergreen herbs to a meter tall from strong, deep taproot systems.

Stems.--Main stems 1 to few, nearly erect from the root, toward the base sometimes nearly 1 cm thick, terete, stiffish, grayish or brownish with a dense matting of short tomentum, the lower leaves absent by flowering time; secondary branches numerous, alternate, swept upward, slender at first and with the pubescence blonde or tan, sometimes nearly reddish-brown, later the branches becoming stouter, firmer, grayish-tomentose, the whole crown becoming quite full, leafy.

Leaves.--Alternate, simple the stipules very reduced, persisting as low, hairy scales, the petioles prominent, mostly 2-5 cm long, densely short hairy, the blades ascending, mostly obovate or elliptic, 5-10 cm. long, broadly acute or obtuse angled, short-mucronate, entire, quite firm, the upper surface gray green, the lower surface more brownish or orangish green, both surfaces matted with close tomentum.

Inflorescence.--Flowers in conspicuous, dense, slender, elongated racemes from 10 to 30 dm long. on stiffish ascending pedicels to 3 mm. long (elongating somewhat in fruit), these and the calyx densely short-tomentose.

Flowers.--Calyx about 1 cm. long, the tube broadly bellshaped, 2-lobed, the upper lobe very low and broad, the lower lip much longer than the calyx tube, linear-triangular. Corolla about 1 cm. long, the standard slightly longer than the wings and keel, short clawed, the blade broadly ovate or nearly round, emarginate, lingulate (the sides folded upward as in the tongue) a pale bright blue with a broad purplish band within along the middle; wings short-clawed, pale blue, the blades narrowly obovate, falcate; keel petals pale blue, strongly curved upward to narrow, yellowish-orange, firm tips. Stamens 10, all filaments fused from the middle downward, 1 set of 5 longer, with short, round anthers, the shorter set with narrower, longer anthers. Ovary superior, narrow, densely silky hairy, the long style curved upward.

Fruit.--Oblong-elliptic, nearly cylindric, beaked, mostly 2-3 cm long, pale brown with ascending, pale, long, shaggy tomentum.

Distribution and Flowering Season

Sandridges toward and along the coast, northwestern Florida. Flowering in April and May.

Special Identifying Features

This distinctive species is the tallest, most erect in habit of the simple leaved southeastern Lupinus with flowers of the same blue as L. diffusus but having a purple "eye" spot quite unlike the white one of that species. L. villosus, whose range overlaps that of L. westianus also, has petals with more purple rather than bright blue tints.

Habitats and Management Implication

L. westianus is confined to dunal formations near the present coast, is locally abundant in windswept sandy clearings in dunes scrub. This scrub is often densely or openly forested with Pinus clausa, this admixed with evergreen scrub oaks, and Ceratiola, Osmanthus, Conradina, Calamintha etc. in the understory. The substrate is always a deep, rather fine sand that at the surface is a glaring white. The habitat is probably maintained naturally for the species by a combination of fire, to reduce woody competition and, wind. Clearcutting of the pine and removal of competing shrubby vegetation would probably increase the species by opening up the habitat, but subsequent establishment of pine plantations would eliminate this shade intolerant plant. Such species should probably be protected in that they tend to help stabilize an otherwise shifting sand. Unrestricted land development along the coast of northwest Florida for various sorts of housing and recreational use is probably the worst hazard to Lupinus westianus.

References

- Small, J. K. 1926. A new lupine from northern Florida. *Torreyana* 26: 91-93. _____ 1933. Manual of the southeastern flora, p. 681. Chapel Hill, N.C.

SPECIES: #131 Lupinus westianus Small, Lupine .

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage								
No Lasting Effect	NA		NA					
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Lupinus westianus Small



LENTIBULARIACEAE

Pinguicula planifolia Chapm. Butterwort

Technical Description

Perennial, forming rosettes to 15 cm broad from a very short stem and a shallow, diffuse rootstock.

Leaves.--Numerous, spreading, thinnish but succulent, somewhat involute, mostly elliptic to oblong, 4-10 cm long, rounded or acute, entire, cuneate to attenuate to a clasping base, greenish or more often strongly maroon-tinted, the surfaces covered with minute glands.

Inflorescence.--Stems (scapes, peduncles) 1 to several, arising singly progressively during flowering, erect or ascending, round in cross section, fleshy, to 2.5 dm tall, with a scattering of short-stalked glands, each terminating in a single flower (rarely in twins).

Flowers.--Erect or slightly nodding, mostly 2-3 cm broad, showy, perfect and irregular. Sepals joined at the base, the calyx to tips 8-10 mm long, slightly 2-lipped, 5-lobed, the lobes oblong, rounded, the upper 3 lobes oblong and directed upward, the lower 2 spreading downward from the short bell-shaped but irregular calyx tube, dark green with a scattering of peg-shaped glandular hairs. Corolla with petal bases fused into a campanulate (bell shaped) spurred tube, this with the short-tubular spur directed downward and the corolla tube ca. 1.5 cm long, laterally attached to the receptacle and its opening directed upward; corolla lobes 5, spreading, lanceolate to oblanceolate, mostly fully 2-3 cm long, split often to near the middle into 2, narrowly oblong lobes, the surfaces a lively pale blue-violet, the edges thickened and papillate. Inside of corolla tube just within the throat with a raised area (palate) hairy with capitate hairs. Stamens 2, arising from upper wall of corolla tube, the anthers on forward and inward short, thickish, arching filaments and nearly touching. Ovary superior, nearly round, covered with minute glandular hairs, the style very short, the stigma broader, irregularly 2-lobed. Placentation free-central, ovules numerous. Fruit.--Capsule round, ca. 5 mm broad, thin-walled, 2-valved, enfolded at the base by ascending calyx tube and its slightly spreading lobes. Seeds narrowly wedge-shaped, the surfaces honeycombed.

Distribution and Flowering Season

In bogs, cypress domes, depressions in flatwoods and savannas, often in shallow standing water, from northwestern Florida (about the longitude of Tallahassee) westward near the present coast into Mississippi. Flowering from February into May.

Special Identifying Features

This species is distinguished best from the other five southeastern Pinguicula by its large, narrow, forked purplish-violet petal lobes and by its strongly red or purplish-tinted rosettes.

Habitat and Management Implications

P. planifolia is a typical bog plant, being most abundant in full sunlight on very moist, acid, peat or peat-sand-muck, where the competition with the predominantly grass-sedge vegetation is least. Merchantible species with which it is most associated would be slash pine, pond pine, longleaf pine and cypress, but

it is never where crowns of such would close, except in the case of the deciduous cypress. It is part of a vegetational assemblage in which periodic fires historically occur, and which probably once favored its increase. Clear cutting followed by any site preparation that did not involve strong alteration of or removal of the top soil layer would favor its increase. Ditches through bogs it frequents are usually lined with rosettes. However, once the drainage is complete enough to dry out the site, this plant disappears. Likewise, it may appear where plantations of pine are started, but disappears when tree crowns close over it, and probably through reduction of soil water and crown closure to shade. The highly organic black bog earths which it grows on are often now converted through drainage and plowing to truck crop or row crop agriculture, this perhaps the largest hazard to the species. Similarly it is lost through conversion of boggy savanna to pasture, in this case mostly through a combination of trampling, drainage, and the promotion of a closed-cover of grasses.

References

- Godfrey, R. K. and H. Larry Stripling. 1961. A synopsis of Pinguicula (Lentibulariaceae) in the southeastern United States. Am. Midl. Nat. 66 (2): 395-409.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1232-1233. Chapel Hill, N. C.
- Wood, C. E. Jr. and R. K. Godfrey. 1957. Pinguicula (Lentibulariaceae) in the southeastern United States. Rhodora 59: 217-330.

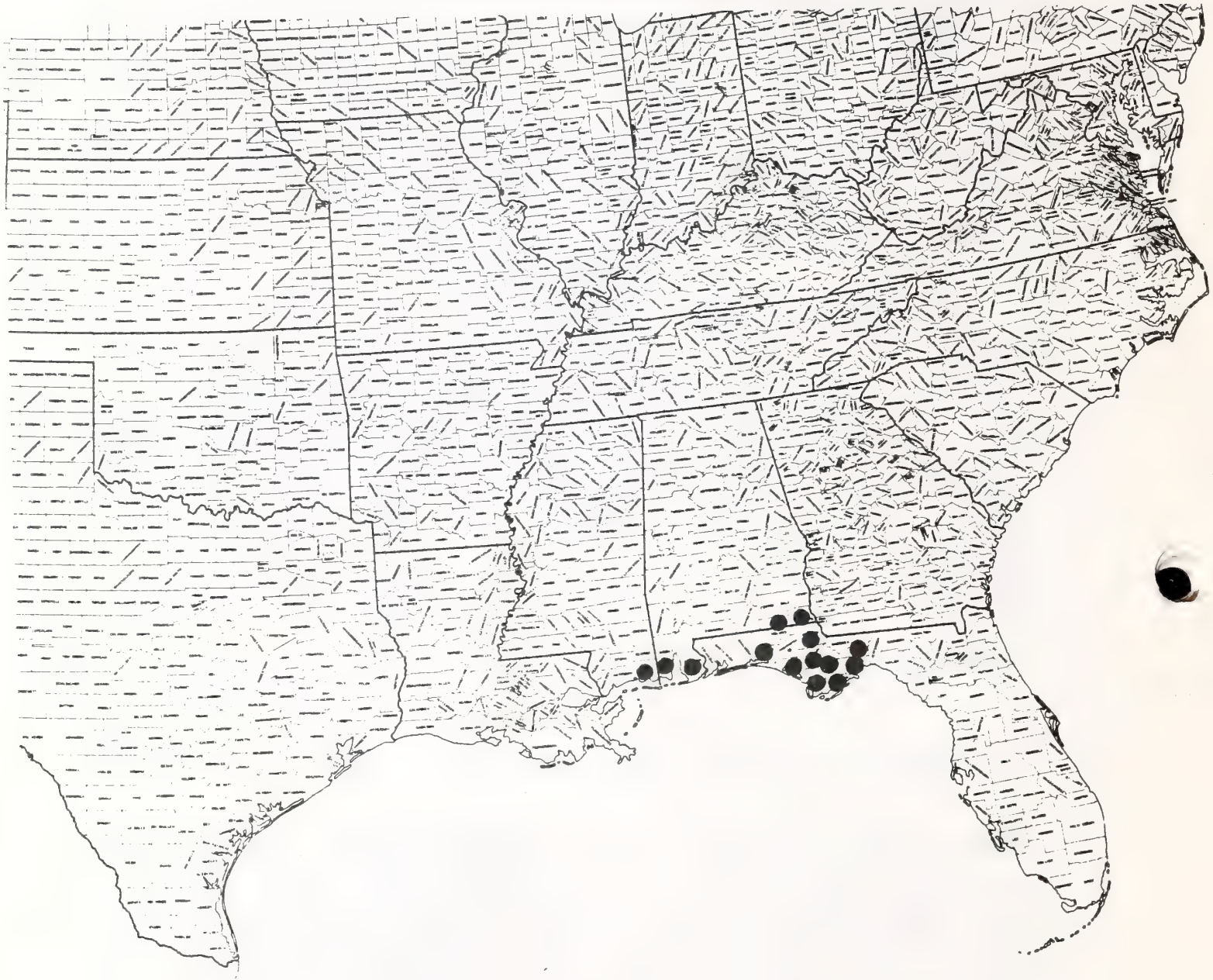
SPECIES Pinguicula planifolia Chapm. Butterwort

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X		X			X	X
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Drainage of site destroys this species!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Pinguicula planifolia Chapm.



LILIACEAE

Lilium grayii S. Wats. Gray's lily; Roan lily or Orange-bell lily

Technical Description

Perennial herbs rooting both from the stem and from deep-set subglobose, scaly bulbs, these putting forth stoloniferous offshoots that terminate in new bulbs.

Stems.--Solitary, erect to as much as 1.5 meters, usually lower, terete, pale green basally, upwardly often deeper green tinted with maroon.

Leaves.--Alternate toward stem base, toward stem middle in whorls of 4-6 on fairly distant nodes, spreading, lance-linear, elliptic-linear to lanceolate or elliptic, mostly 5-10 cm long, acuminate, the margins finely scabrid with bluntish tubercles, the bases narrowly acute or attenuate to a short petiole or sessile, the upper surface dark green, the lower surface paler with the several raised and parallel nerves often minutely scabrid. Stem leaves gradually reduced to alternate bracteal leaves, these frequently crowded on larger specimens, under or on flower stalks longer than the flowers.

Inflorescence.--Flowers 1-9, symmetrical, somewhat nodding or spreading on ascending stalks, at anthesis campanulate.

Flowers.--Tepals mostly 4-5 cm long, oblanceolate, mucronate, entire, the bases cuneate, all blades spreading but slightly toward their tips, the outer surfaces a fine orange-red, with deeper (almost cinnamon) red mid-nerves, paler and with greenish tints basally, the inner surfaces orange-red toward the tips, yellow medially and toward the base, liberally freckled with cinnamon-red splotches. Stamens 6, projecting forward, shorter than the tepals, the filaments slender, yellowish, broadening slightly toward the base, the anthers cinnamon-red, versatile, short-oblong, about 5 mm long.

Fruit.--Capsule (not seen by this writer) oblong, 3-4 cm long, erect.

Distribution and Flowering Season

Acidic clearings in shrub thickets, open woods, heath and grass balds, higher elevations in the Blue Ridge, along the Tennessee-North Carolina border and northward into southwest Virginia. Flowering late June, July.

Special Identifying Features

This species is closest to L. canadense, another bulb and stem rooter of acidic soils within the area, but has much smaller flowers, (the tepals of which are broader) shorter leaves (which have the lowest length-width ratio of southern Liliums), and a lower stature. The white bulb scale character mentioned by J. K. Small does not hold in that these may be found in both L. canadense and L. superbum.

Habitats and Management Implication

Lilium grayii has its bulbs deepset in moist, highly organic and siliceous black loams such as develop in grass-sedge meadows and clearings toward the mountain summits. Very often it is found in clearings amidst Rhododendron

Catawbiense, other heaths, alder, willow, shadbush, etc. or along the edges of red spruce-Fraser fir but never beneath them. Since most of its present habitat is within the boundaries of National parks, National forest or State parks, and since the plant has long been known to be rare and is protected, it may have some chance. The main threat to it today is not so much through habitat damage as through the gathering of the bulbs by professional or amateur gardeners or through vandalism.

References

Small, J. K. 1933. Manual of the southeastern flora, pp. 290-291. Chapel Hill, N.C.

Watson, Sereno. 1879. Revision of North American Liliaceae.
Proc. Am. Acad. Arts and Sci. 14:213-303.

SPECIES: #136 Lilium grayii S. Wats; Roan lily or Orange-bell lily

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	X
Damage						X		
No Lasting Effect	NA			>				
Beneficial if Done Properly					X			

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Lilium grayii S. Wats.



LILIACEAE

Trillium texanum Buckley. Wake-robin

Technical Description

Strongly clonal, with clones of often several hundred shoots (many merely with leaves) arising from narrow, pale, deep-set, horizontal to ascending terete rhizomes 5-10 mm thick and often to 1 dm long.

Scapes.--Stiffly erect or ascending from a bowed base, mostly 1-2 dm high to level of bracteal leaves, fleshy, often strongly tinged with red, smooth, terete with many low ribs, gradually tapering from a base ca. 4-5 mm thick, this sleeved by a thin, tan, erect rhizomal scale-leaf.

Bracteal leaves.--Mostly 3, spreading-ascending, oblong, lance-oblong or elliptic-oblong, ca. 5-10 cm long, mainly 1.5-2.5 cm wide, apically usually broadly rounded, the bases narrowly cuneate to attenuate, often narrowed to short, petiole-like stalks, the surfaces grayish-green with stomates evident on the upper surfaces and with 5 longitudinal veins evident.

Flowers.--Solitary, ascending or nearly spreading horizontally on ascending, slender but stiff, greenish or reddish-green stalks 2-4 cm long; sepals spreading-ascending at anthesis, usually 3, lance-oblong, 2-3 cm long, blunt, with color and stomates as in bracteal leaves, becoming more erect by fruiting time; petals usually 3, at early anthesis white, ascending, at late anthesis more spreading and turning pink, ovate or lance-ovate, 2-3 cm long, narrowing to a narrow but blunt tip, the margins somewhat wavy, the base broadly cuneate or short-clawed; stamens 6, 10-12 mm long, the anthers oblong-linear, 6-8 mm long, introrse, with connectives purplish-tinged, on somewhat flattened, ascending pale filaments; ovary pale green (with a few rows of stomates) ovoid, ca. 3 mm high, tapering to a deeper-green, erect, fleshy, lineal style ca. 2 mm long, the stigmas ascending, excurvate, lineal, ca. 3 mm long, pale green, the stigmatic surface granular.

Fruit.--Body of fruit ovoid, 7-8 mm long, yellow-green, with 6 low ribs evident at the narrow apex, the style persistent as a slightly tapering beak; seeds (fide Dr. Freeman!) 8-15.

Distribution and Flowering Season

Acid hardwood bottoms, sphagnum wooded seeps and branchbanks, northwestern Louisiana and eastern Texas; flowering from March into mid April.

Special Identifying Features

There are three other low, white-flowered trilliums native to the southeastern United States, these all placed by most specialists as varieties of T. pusillum Michx. Trillium pusillum var. pusillum and T. pusillum var. ozarkanum (Palmer & Steyermark) Steyermark

range nearest T. texanum, the former being found in the Coastal Plain of Mississippi, the latter mostly ozarkian but also found in the Ouachitas of southwestern Arkansas. Occasionally both of these varieties may form small clumps by means of rhizomal branching but neither develop the large "solid" patches that are formed by T. texanum, which also has a much longer and usually more slender rhizome. When living plants are compared, T. texanum stands out even at a distance because of the paler green of its bracteal leaves and sepals, the "grayness" being imparted by the abundance of stomates on the upper as well as lower surfaces. The outline of bracteal leaves is also distinctive, those of T. texanum tending more toward oblong, sometimes even broadest above the middle, and with bases more strongly tapering. The petals of T. pusillum tend after anthesis to deepen to deep purple, to become very narrow and involute, are strongly recurved, pointing downward between the erect sepals; those of T. texanum do not deepen as much in color, often do not recurve. The fruit of T. pusillum is much more strongly ribbed than is that of T. texanum. In habitat T. pusillum pusillum is mostly low rises in large bottomlands or, if upland, area where the soil is heavy. T. pusillum ozarkanum takes more upland, acidic soils, being commonest in area where chert gravel is predominant; when it is found in ravine bottoms or stream bottoms, usually the soils are well drained and cherty.

Habitat and Management Implications:

Trillium texanum is found invariably in moist to wet sites and is definitely a shade plant. Most known localities would be characterized as boggy, usually the seep borders of ravine streams with plenty of Alnus, Myrica, Cornus, Vaccinium, Itea in the shrub layer and with green and pop ash, red maple, bottomland oaks, mostly in the willow oak complex, also much red gum, black gum and lowland hickory and elm. Magnolia virginiana is almost always present, some of merchantable size. Of pines, P. taeda is often present, sometimes abundant. Associated herbaceous species include a variety of lowland grasses and sedges, bog orchids (particularly rein-orchids), rushes, bog violets (particularly Viola primulifolia, sometimes Parnassia asarifolia). Lowland ferns in Osmunda, Thelypteris, Athyrium, Woodwardia, Onoclea are frequent to abundant. Sphagnum species often mat the ground. The trillium may also occur in broader bottoms, usually on sandy-silty rises where there is some drainage but where the ground remains moist, such as would be found along the small tributaries to larger meandering streams.

The habitat of this trillium is threatened in two main ways. The larger bottoms, where this plant may be quite local, are being drained, clearcut, converted to pine. The soil disturbance, loss of soil water and admittance of too much light all are destructive of trillium habitat. Opening up such tracts for woodland pasture similarly destroys trillium. The other, and prevalent, danger is apparent when one visits the sandhills ravine habitat. Much of

east Texas sandhills is forested with low grade oak and hickory, or these mixed with pine. Huge tracts of sandhills are now being cleared, site prepped for pine plantation. Although this is itself not trillium habitat, the erosion from such large preparations results in the small branch bottoms which are true trillium habitat being buried by sandy wash. This often kills much of the bottomland hardwood reproduction and even larger trees; it also buries herbaceous cover to such an extent that nothing but a deep layer of wash is evident.

Thus preservation of Trillium texanum heavily depends on recognition of existing sites for it, preserving these from any logging save single tree selection, prevention of any drainage ditching, excluding any livestock use, recommending to those who log adjacent uplands that they leave a sufficient strip of undisturbed timber downslope so as to protect the small stream bottoms.

References

Buckley, S. B. 1860. Description of several new species of plants. Proc. Acad. Nat. Sci. Philad. 12: 443-445.

Correll, D.S. and M.C. Johnston. 1970. Manual of the vascular plants of Texas, p. 408. Renner, Texas.

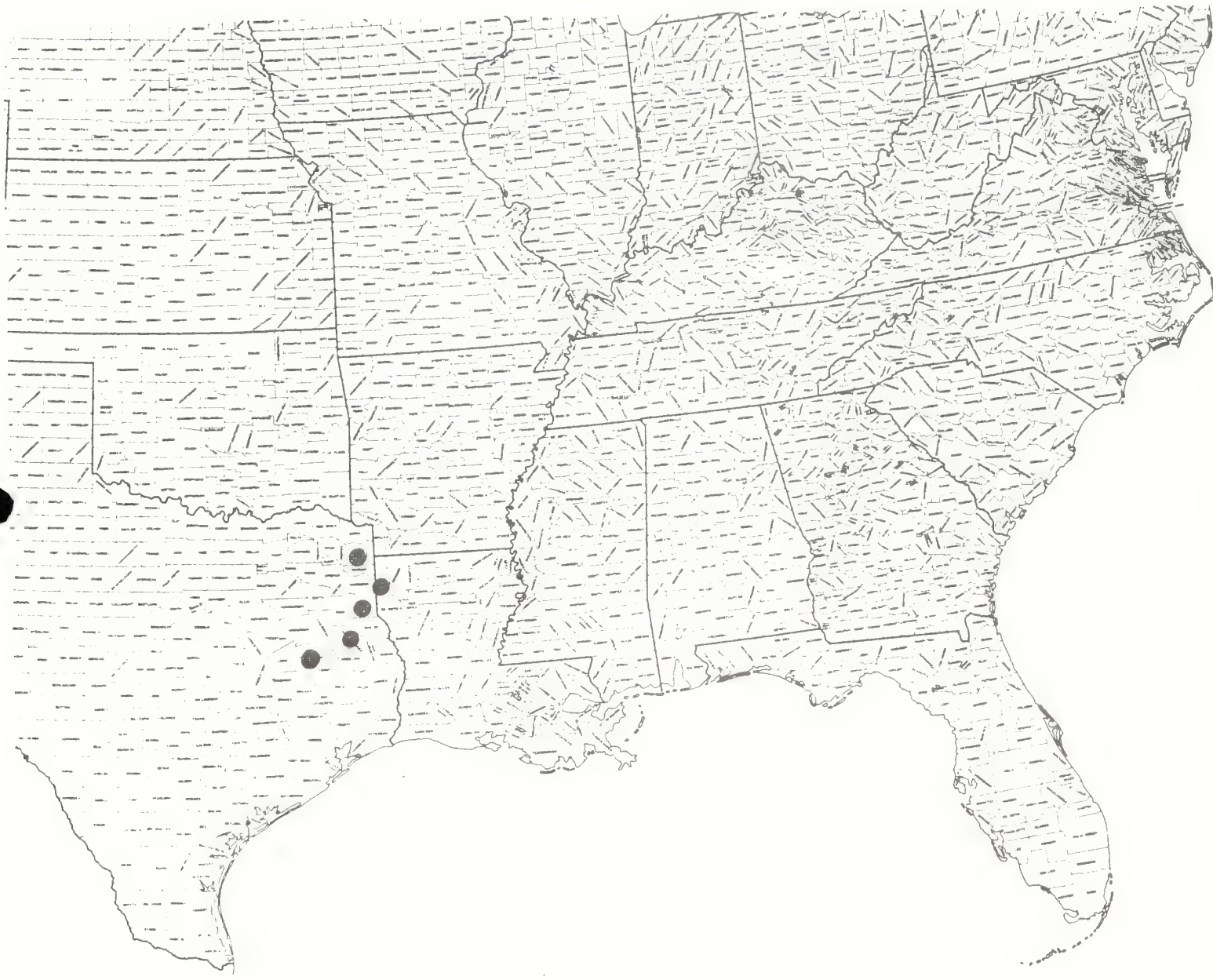
SPECIES Trillium texanum Buckley. Wake-robin

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	X	X	X		X	X	X
Damage					X			
No Lasting Effect								
Beneficial if Done Properly								

Other Comments: Draining the boggy habitat would destroy
this trillium!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Trillium texanum Buckl.



Zephyranthes simpsonii Chapm. Rain zephyrlily;
Atamasco lily; zephyr lily

Atamasco simpsonii (Chapm.) Greene

Technical Description

Glabrous perennial herb at most to 3 dm. tall arising from a thin-jacketed bulb (as in Narcissus).

Leaves.--Linear, basal, overlapping by sheathing bases, the blades elongate-linear, numerous, spreading, fleshy, a lustrous green, sometimes tinted with red, about 2 mm. broad, around 2 dm. long, the backs rounded, the edges rounded and smooth, the upper surface grooved.

Inflorescence.--Scapes 1 or few (the bulbs solitary or in small clusters), erect or spreading, broader than the leaves and often appearing as they die, terete or somewhat flattened, pale green with tinges of red toward the apex and terminating in a tubular, reddish-purple bract which includes the single bud. The bract splits as the bud open, becomes darker red and is 2-cleft half its length or more.

Flowers.--Symmetrical, erect, showy, 5-10 cm. long, the tepals (the 3 petals and 3 sepals similar except in position) arising from a tubular base, oblong-lanceolate, short-acuminate, opening white, sometimes tinted with pink, aging through red to purple, spreading only slightly, stamens 6, erect, the elongate white filaments arising from the perianth tube apex, the oblong-linear anthers yellowish. Ovary inferior; style elongate, slender, branching at its summit into 3, short-linear stigmas at about the level of the anthers.

Fruit.--A 3-lobed capsule; seeds few, semicircular, a lustrous black.

Distribution and Flowering Season

Wet clearings in pine-saw palmetto flatwoods, savannas, pasture, roadsides, central and southern peninsular Florida. Flowering February to April.

Special Identifying Features

There are but 3 native species of Zephyranthes in the southeast, of which the commonest and most widespread is the Atamasco Lily, Z. amatasco (L.) Herb. This is a clump former of rich bluffs and low rich woods with broader, longer leaves and larger, often broader and rounder tepals, and generally with less red pigments; its stigma branches arise at a level well above the anthers in the mature flower. The other species, also considered threatened, is Z. treatiae S. Wat. (Atamasco treatiae (S. Wats. Greene) which is in wet pine flatwoods from central peninsular Florida northward and westward to Gadsden Co., Florida. This is very similar to Z. simpsonii in leaf and flower character, the leaves being but slightly broader, the tepals tending to spread apart further in full flower. A significant difference is in the level the stigma lobes are presented

which is, as in Z. atamasco, well above the level of the anthers.

Habitats and Management Implication

Z. simpsonii and Z. treatiae are both species of low pine flatwoods or pine dotted savannas, here locally abundant in black, highly organic sands. Both, in undisturbed flatwoods, flower sparsely as competing herbaceous or shrubby vegetation increases; both respond with vigorous flowering after fire disturbance. Both species are now more commonly seen on moist to wet mowed roadbanks or in pastures which were formerly pine flatwoods, here grazing or mowing appearing to operate effectively to reduce competition of other plants. In that both species appear to move to such artificial situations, and to increase dramatically there, they are less threatened than might appear from the abuse of their original habitat. However, efficient drainage will cause a decrease even of the roadside populations, these being plants of quite moist soils. Site preparation involving major soil disturbance or drainage ditching will reduce the populations. Clearcutting itself will at least temporarily increase both.

References

- Godfrey, R.K. and J. Wooten. 197-. Aquatic and wetland plants of the southeastern United States. Zephyranthes, in unpublished Manuscript.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 320-321. Chapel Hill, N.C.

SPECIES: #142 Zephyranthes simpsonii Chapm.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								
No Lasting Effect								X
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Zephyranthes simpsonii Chapm.



ILICIACEAE

Ilicium parviflorum Michx. ex Vent. Yellow anise tree;
star-anise

Technical Description

Large shrub or small tree to 7 meters from a shallowly spreading root system.

Stems.--The trunks single or several from the root, erect or leaning outward, the bark grayish-brown, smoothish, the fresh wood, twigs, leaves and flowers smelling of licorice. Branching slender and forking, the newer shoots slender, smooth, greenish-brown or tan, leafy only toward the tips.

Leaves.--Alternate in close spirals, persistent, spreading-ascending on greenish, grooved, slender petioles 2-3 cm long, the blades oblanceolate or elliptic, the largest mostly 10-15 cm. long, leathery, acute but blunt and rounded-tipped, the margins entire, very slightly emarginate, the base narrowly cuneate or attenuate, the upper surface a dark, glossy green, the lower surface paler, finely pale gland-dotted, only the midrib prominently raised.

Inflorescence.--Flowers 1-few, set in the terminal clusters of leaves on slender, pale, greenish spreading or erect stalks to 3 cm long, symmetrical, about 2 cm across.

Flowers.--Sepals 3-6, ovate, greenish, under 1 cm long. Petals numerous, ovate or oblong, about 1 cm long, yellowish, spreading. Stamens numerous, ca. 3 mm long, the filaments broad as the anthers, linear, somewhat flattened, spreading to form a ring; anther sacs 2, short-oblong. Carpels numerous, forming a ring, at first erect, tapering to narrow, outward pointing tips.

Fruit.--Follicles spreading like the rays of a star, the whole cluster about 2 cm broad, splitting along the upper edge each to release a single brown shiny seed.

Distribution and Flowering Season

Low hammocks along streams, northeastern peninsular Florida. Flowering in May, June.

Special Identifying Features

This unique tree is confined to the tributary systems of the lower St. Johns River. It is distinguished from the more widespread I. floridanum by its leaf tips which are blunt rather than sharply acute or acuminate, by its smaller, greenish-yellow flowers, by its somewhat smaller fruit.

Habitats and Management Implication

I. parviflorum is typically a plant of low hammocks on sandy loams or sandy peat mucks, in short on soils that are continuously moist. It is entirely within a karst country, generally along sandy-bottomed clear

streams that arise from limesinks, usually in the shade of larger trees such as Magnolia virginiana, willow oaks, occasionally cypress, gum and associated with waxmyrtle, Lyonia, cabbage and saw palmetto, Ilex cassine, Cyrilla, Persea, Gordonia, etc. and never reaches up into the contiguous stands of upland evergreen scrub oak, scrub pine or longleaf. It is thus an understory small tree, quite shade tolerant, its reproduction scant, succeeding on moist, highly organic, shaded soils, although it may be cultivated in full sun. Drainage or cutting, particularly clear-cutting, would be detrimental. The trees, sometimes sold as I. anisatum, have been commercially exploited and are rare and local enough to comprise a truly endangered species.

References

Small, J. K. 1933. Manual of the southeastern flora, pp. 533-534. Chapel Hill, N.C.

Stone, D. E. and Judith L. Freeman. 1968. Cytotaxonomy of Ilicium floridanum and I. parviflorum (Iliciaceae). Journ. Arn. Arb. 49(1): 41-51.

SPECIES: #144 Ilicium parviflorum Michx. ex Vent. Star-anise

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X		X		
Damage							NA	?
No Lasting Effect	NA				X			
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Ilicium parviflorum Michx. ex Vent.



POLYGONACEAE

Polygonella macrophylla Small. Large-leaved jointweed;
jointweeds

Technical Description

Shrublike perennial.

Stems.--The one to several shoots stiffly erect from a strong taproot, to more than a meter tall, glabrous, round in cross section, but finely ribbed, reddish-brown to gray-green, simple or with short erectish leafy lateral branches and branching in the inflorescence.

Leaves.--Numerous, alternate, ascending or erect, the lowest largest, mostly obovate, cuneate or broadly spatulate, mostly 2.5-6.0 cm long, 1.0-2.5 cm broad, flat, rather leathery, the tips rounded, the margins entire, often pale, the base cuneate, sessile or nearly so. Ocreae short-cylindric, firm, dark to pale brown, entire. Stem leaves gradually reduced in size upward, grading into bracts.

Inflorescence.--A dense to somewhat open system of ascending or spreading sessile racemes (sometimes branched), these short-oblong or ovate in outline, with broadly funnelform, overlapping ocreolae.

Flowers.--Mostly bisexual, on slender stalks projecting from the ocreolae, terminating in a narrow perianth tube that gradually expands upward, then flares into the 5 calyx segments (the longest about 3.0-3.5 mm long); the three outer sepal lobes broadest, with short claws and broadly ovate or obovate to suborbicular blades which are white at blooming time; inner sepal lobes narrower; all calyx lobes erect or slightly spreading in bloom, spreading or even reflexed in fruit. Stamens 5, about as long as the sepals in bloom, the white filaments lineal, some broader than others, the anthers white or yellow roundish. Ovary lance-ovoid, trigonous, its tip producing 3 narrow distinct style branches and stigma bottoms.

Fruit.--Akene lance-ovate, strongly trigonous, about 3 mm long, pale yellow brown, smooth, lustrous.

Distribution and Flowering Season

This species is local on the white sands of clearings in the sand pine-evergreen scrub oak toward the coast of the Florida Panhandle and in Baldwin County Alabama. It flowers in late fall (mostly October) and fruits in November.

Habitats and Management Implication

P. macrophylla is always on deep, white sands, either on clearings in the sand pine scrub or in open stands of overstory. It is associated with such shrubby genera as Ceratiola, Conradina (an aromatic, blue-flowered, shrubby mint), Calamintha, and sandhills herbs such as Balduina, Heterotheca, Andropogon, Panicum, Aristida, Agalinis. Much of this evergreen scrub complex is being leveled for the purpose of housing and such would of course eliminate the species. Some other areas of it are being clear-cut and put to slash pine or longleaf pine, and the species may at first

increase in these areas until such time as the crowns of the pines close. In nature the species probably maintained itself through fire disturbance sufficient to make clearings in the scrub.

References

Small, J.K. 1933. Manual of the Southeastern Flora, page 449. Chapel Hill, N.C.

Horton, J.H. 1963. A taxonomic revision of Polygonella (Polygonaceae).
Brittonia 15: 177-203

SPECIES: #149 Polygonella macrophylla Small Jointweed.

Management Practices								
Expected* Effect on the Species	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X				
Damage	X		NA				If Sand	
No Lasting Effect							Pine OK	?
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Polygonella macrophylla Small



RANUNCULACEAE

Cimicifuga rubifolia Kearney. Appalachian bugbane; Bugbane

Technical Description

Tall, but rather slender perennial herb, to 1.5 meters, the single, erect or ascending shoot from a knotty, irregularly horizontal rhizome.
Stems.---Roundish in cross section, often maroon-tinted, usually smooth or with a villous-hairy line, usually unbranched and wand-like in flower.
Leaves.---Few, concentrated toward the stem-base, the petioles elongate, sheathing the stem-base, 3-branched, with each branch again 3-branched (ternate), the leaflets symmetrically or asymmetrically ovate to orbicular prominently 3-5 (-7) lobed (much as in Red Maple in size and outline) to 1.2 dm long on petiolules slightly shorter, the lobe tips acuminate, the margins coarsely and irregularly serrate, the bases usually cordate, the upper surfaces deep green, smooth, the lower surfaces paler, smooth or with some long, crisped hairs on the raised veins.
Inflorescence.---An elongate, terminal openly cylindrical raceme of whitish flowers, the axis puberulent.
Flowers.---Symmetrical; sepals 2-5, falling off when or shortly after the bud opens, ovate-suborbicular, yellowish-white, smooth, ciliate or entire. Petals absent. Stamens numerous, on a slightly elevated receptacle, the filaments white, filiform but slightly broadening upward, the anthers short, yellowish-white. Carpels no more than 2, sessile on the receptacle.
Fruit.---Asymmetrically oblong, 8-10 mm long, somewhat flattened, veiny, the numerous small seeds chaffy, in 2, irregular rows.

Distribution and Flowering Season

This species occurs sporadically in the Ridge-and-Valley, Cumberland Plateau, and Highland Rim in northeastern Alabama, Tennessee, and Virginia. It flowers mostly in the early fall.

Special Identifying Features

Taxonomically it is closest to C. racemosa, in that it has no more than 2 carpels and its seeds are in more than one row. It is distinguished from that species by (a.) its much later flowering habit (C. racemosa flowers in early summer) (b.) its larger, broader, more lobed leaflets which are strongly cordate-based (c.) its shorter (-4 mm in contrast to 8 mm) filaments and (d.) its longer (8-10 mm in contrast to 5-7 mm) follicles.

Habitats and Management Implication

This rather rare species is found in rich, well-drained, loamy soils in open, mixed-mesophytic, forested slopes. Typically these are soils formed over limestones or calcareous shales and are moist, never wet,



STEMONACEAE

Croomia pauciflora (Nutt.) Torr.; few-flowered
croomia; Croomia

Technical Description

Smooth perennial herb forming large clones by means of shallow, pale, elongate rhizomes.

Stems.--Erect, terminating rhizomal branches, mostly 1.5-3.0 dm tall, slender, round, about 3 mm thick, green, often with tints of red, the lower part loosely sheathed by scale-like leaves, otherwise leafless to near the summit, there with 4-6 spreading leaves.

Leaves.--Alternate but often so close-set as to appear whorled (the plants look very much like some of the herbaceous smilax!!). Leaves spreading in all directions on petioles mostly 2-3 cm long, the blades ovate, elliptic or oblong, mostly 6-10 cm long, thin, yellow-green, acute or short-acuminate, entire, the bases cordate or auriculate, the veins palmate.

Inflorescence.--Flowers small, actinomorphic, about 0.5 cm across, usually 1-2 cm toward the summit of slender spreading or nodding stalks 2-3 cm long from the leaf axils, the stalk usually with 1 small, thin bract at or above its middle, this subtending the lower flower if there is one, this lower flower on a shortish pedicel 2-5 mm long.

Flowers.--Perianth greenish, of 2 sepals and 2 petals, these alike except for position, spreading horizontally, fused at their bases, narrowly ovate, 3.5-4.5 mm long, acute, entire. Stamens erect, 4, distinct, the filaments stout, oblong, 1.0-1.5 mm long, bowed slightly inward, the yellow anthers oblique on the filament summits, short-oblong, their bases pointing inward. Ovary superior, ovoid, between 0.7 and 0.9 mm long, greenish, 1-celled with few ovules and with a fleshy sessile stigma.

Fruit.--A somewhat fleshy, 2-valved ovoid, greenish capsule about 1 cm. long or slightly longer, with the perianth persisting around its base. Seeds few.

Distribution and Flowering Season

Rich loamy soils over limestone, usually in shade of mixed hardwoods, southern and western Georgia through most of the calcareous districts of Alabama in the Appalachian trend and southward infrequently into northwestern Florida. Flowering from late March into May.

Special Identifying Features

As mentioned in the description, Croomia plants vegetatively look much like some of the smaller herbaceous Smilax but differ in having fewer perianth segments, fewer stamens, and having the fruit a capsule rather than a berry.

Habitats and Management Implication

Croomia plants are almost always found on moist, very humified, well drained circumneutral soils under rich deciduous forest, mostly in

the mixed mesophytic type. They are invariably in association with such spring flowering herbs as Trillium, Hepatica, Sanquinaria, Erythronium, Actaea, Podophyllum, Dentaria. There they form scattered but quite large clones consisting often of hundreds of stems. Like so many other spring herbs of this type which flower before the overstory canopy is full they tend to die back to the root toward the summer.

Selective logging of the mixed mesophytic overstory would probably not much effect this species. Heavy logging or clear cutting with the attendant heavy soil disturbance and erosion, particularly also with the admission of more light with subsequent heating and drying of the soil would eliminate this plant. Such would either be through changing of the soil by lowering humus content as well as fertility, or through promotion of light tolerant woody weeds such as Smilax, Rubus, Lonicera, etc. which would crowd out the plants. The plants, probably more through trampling and subsequent erosion, do not hold up well when the forest is opened to grazing livestock. Thus, either through excessive timber cutting or conversion of woodlots to pasture, the distribution of Croomia within its range has been drastically reduced.

References

Small, J. K. 1933. Manual of the Southeastern Flora, p. 309.

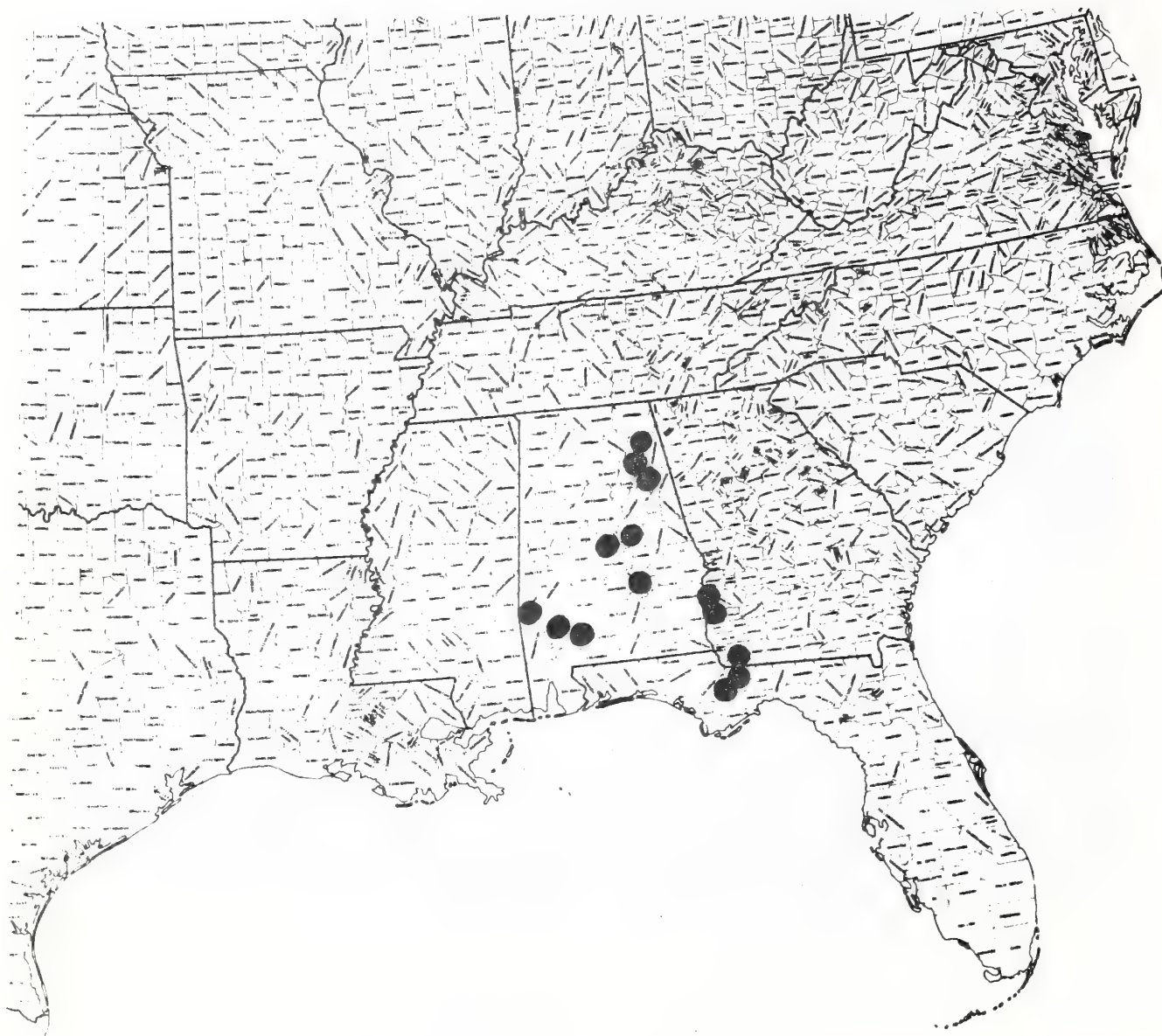
SPECIES: #152 Croomia pauciflora (Nutt.) Torr.: Croomia

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy						X		
Damage							NA	
No Lasting Effect	NA			→	X			
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Croomia pauciflora (Nutt.) Torr.



XYRIDACEAE

Xyris drummondii Malme. Drummond's yellow-eyed grass;
Yellow-eyed grass

Technical Description

A low, very tufted, herbaceous plant, usually with the bases buried in peat or sand.

Leaves.--Broadly linear or lanceolate, 3-8 cm long, acute, mostly entire, the blades greenish but each with a shining dark brown "patch" at the base, and all arranged in a small fan (resembling leaf arrangement in Iris but tiny!)

Inflorescence.--Scapes slender (linear-filiform), but stiffly erect, 4-20 cm long, low-ribbed, the scape sheathes with leaf-like blades and about as long as most of the leaves. Spikes many-flowered, terminal and solitary on scapes, each resembling a small cone, lance-ovoid, mostly 8 mm. long or slightly less, sharp-tipped, somewhat laterally flattened. Bracts several, spirally arranged or in 2 ranks, the lowest sterile, sometimes with green narrow tips, the rest fertile, nearly round to obovate, keeled (appearing folded, the mid-rib along the angle) and each brownish with an elongated, narrowly elliptical or lanceolate dorsal area (a greenish area different in texture and along the mid-rib of the scale).

Flowers.--Lateral sepals 2, boat-shaped, chaffy, opposite, keeled, with the keel margin ciliate (there is a 3rd sepal, this a membrane that covers the flower in bud and falls off when the petals expand). Petals 3, clawed, yellow, the blades spreading in morning, obovate, about 3 mm long. Staminodes 3, flat and slender below, above branching and covered with a brush of slender, long, yellowish hairs. Stamens 3, attached toward base of petal blades.

Fruit.--Capsule clasped by the lateral sepals, thin-walled, splitting longitudinally. Seeds numerous, attached in 3 longitudinal zones on inside of capsule, ellipsoidal, about 0.3 mm long, finely ribbed.

Distribution and Management Implication

Moist to wet acid sands or sandy peats of bogs and seeps in the Coastal Plain from southeast Georgia westward through northwestern Florida and south Alabama to southern Mississippi and Louisiana. Flowering from July through September.

Special Identifying Features

This is in a complex of little species such as X. flabelliformis and X. brevifolia which superficially look much like it. However, those two species flower mostly in spring and early summer, while this one flowers in summer and fall. Also, this is the only one in the complex that has the distinctive, chestnut-brown patch at the leaf base and the definitely laterally flattened spike.

Habitats and Management Implications

X. drummondii is always a plant of bogs or boggy places where the soil moisture is high. It is always in full sun and should be found usually where seepage has created exposures of wet fine sand and peat, there in association with other bog species of Drosera, low Panicum. Eriocaulaceae (Pipeworts), Rhexia. Small pitcher plant bogs in slash longleaf and pond pine flats are ideal situations. In that such areas have histories of fire and in that fire tends to reduce overgrowth of shrub understory species of Ilex, Myrica etc. that would otherwise take the habitat, it is to be assumed that this is a part of the grass-sedge-forb complex that makes up fire disclimax. The species is often found in areas where clear-cutting of pine accompanied by considerable disturbance of soil has occurred in addition to (frequently) ground fire. However, in areas where clear-cutting or other logging or site preparation has occurred and also drainage, the species disappears. Obviously its major enemy is drainage, not logging of associated overstory or mechanical site preparation. However, while it will occur in plantations where the young trees are on elevated "strips", it will not persist after the crowns have closed.

Reference

- Kral, R. 1966. Xyris of the continental United States and Canada, Sida 2 (3): 177-260.

SPECIES: #153 Xyris drummondii Malme. Yellow-eyed grass

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy								
Damage								X
No Lasting Effect		?	X	?				
Beneficial if Done Properly	X				X	X		

Other Comments: Drainage the problem

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Xyris drummondii Malme



XYRIDACEAE

Xyris isoetifolia Kral.; Quillwort yellow-eyed grass;
Yellow-eyed grass

Technical Description

Similar to X. drummondii, but taller.

Leaves.--Densely tufted, very slender (filiform) to 15 cm long, the narrow blades pale green, the bases broader, brownish and chaffy.

Inflorescence.--The flowering stalks (scapes) are narrowly linear, to 30 cm. long, are stiffly erect, in cross section oval or round, and each has a bladed sheath shorter than the leaves (the sheath blade similar to the leaf blade). Each scape terminates in a single cone-like spike, this 4-7 mm long, ovoid or ellipsoidal, acute or blunt, of many tightly overlapping scaley, chaffy bracts, the lower 2-3 sterile (without flowers in axils), the rest fertile. Fertile bracts ovate or obovate, about 5-7 mm long, scale-like, the apices rounded, the margins entire, the backs rounded, brown or reddish brown with dull green dorsal areas.

Flowers.--The lateral sepals, hidden by subtending bracts are similar to X. drummondii, being boat-like, chaffy, the keels ciliate. Petals with blades projecting beyond the subtending bracts, unfolding and spreading in the morning, yellow, obovate, ca. 4 mm long. Stamens and staminodia as in the preceding.

Fruit.--Capsule similar to the preceding. Seeds somewhat larger, about 0.5 mm long, faintly ribbed.

Distribution and Flowering Season

Moist sands or sandy-peats of savanna bogs, flatwoods pond margins, shores of limesink ponds and lakes, northwest Florida (Bay and Gulf Counties). Flowering from July into September.

Special Identifying Features

X. isoetifolia strongly resembles in its tufted habit, leaves and spikes X. baldwiniana, a species widespread in the Coastal Plain from eastern N. C. south to Fla. and west into eastern Texas. It differs mostly in having ciliate keels on the lateral sepals and in having a beard of hairs on the staminodes (these are lacking in X. baldwiniana).

Habitats and Management Implication

X. isoetifolia appears to be restricted to the karst country of northwest Florida, either directly around the ponds and lakes formed by "sinks" or in the poorly drained flatwoods surrounding. In either case it is commonly in full sun and associated with grass-sedge bog species of herbs. It may locally abound where wash has produced expanses of wet peaty sand and has been observed in abundance where pine flatwoods have been logged so as to

create wet openings. It is another species of fire disclimax, probably increased through reduction through fire of competing woody plant species and the rough they create, but definitely reduced or eliminated where drainage is created.

Reference

Kral, R. 1966. Xyris of the Continental United States and Canada,
Sida 2(3): 177-260.

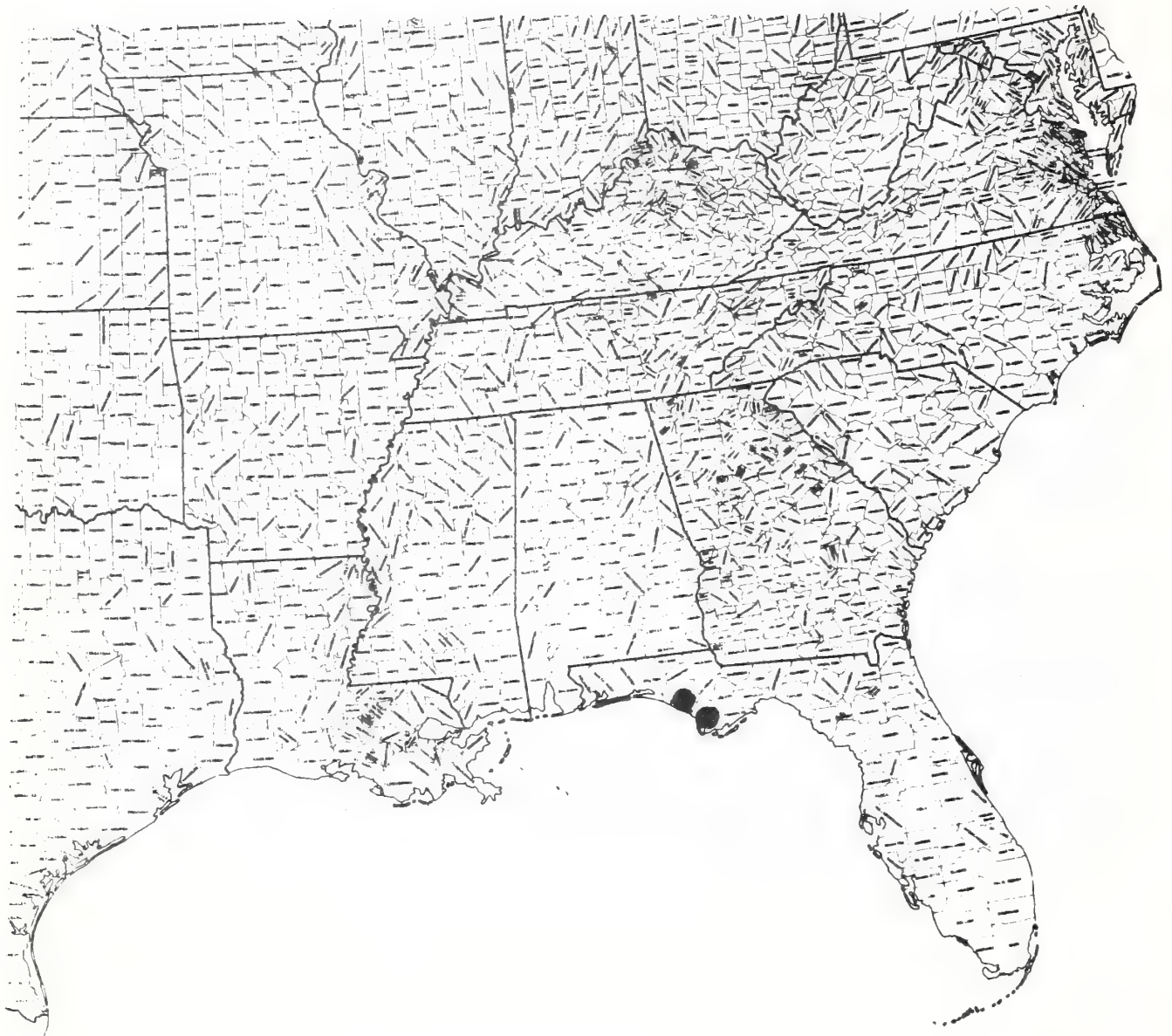
SPECIES: #154 Xyris isoetifolia Kral Yellow-eyed grass

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy								
Damage								
No Lasting Effect								
Beneficial if Done Properly								

Other Comments: Drainage the problem, also shade.

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Xyris isoetifolia Kral



XYRIDACEAE

Xyris longisepala Kral. Kral's yellow-eyed grass;
Yellow-eyed grass

Technical Description

Similar to the preceding but taller, coarser, less tufted.

Leaves.--Linear, to 25 cm long, 2 mm broad, acute, mostly erect, smooth, the blades greenish, the sheathing bases usually with touches of pink or maroon.

Inflorescence.--Flowering stalks (scapes) mostly 4-8 cm. tall, slenderly linear and sometimes twisted, toward the tips somewhat flattened and strongly 1-edged. Scape sheathes shorter than the leaves, with shortish blades. Spikes ellipsoidal to oblong, 1.0-1.6 cm long, blunt, of many, loosely overlapping bracts. Fertile bracts broadly oblong, 4-6 mm long, the tips rounded, the margins entire, the backs rounded, tan with a pale greenish or reddish-brown dorsal area.

Flowers and Fruit.--Lateral sepals linear-curve, slightly longer than the subtending fertile bract and thus with tips projecting beyond (exserted); keel narrowly jagged (the edge irregularly slender toothed) or ciliate. The 3 blades of the corolla obovate, about 3.5 mm long, unfolding in afternoon, yellow. Stamens and stamens as in the preceding. Seeds 0.4-0.5 mm long, longitudinally low-ridged, amber.

Distribution and Flowering Season

Moist to wet sandy shores of limesink lakes and ponds, northwest Florida and southeastern Alabama. Flowering from July through September.

Special Identifying Features

X. longisepala is similar to X. smalliana a more widespread species of swamps in the Coastal Plain from N.J. south to south Florida and west to southern Mississippi. However, X. longisepala is a smaller plant of consistently different habitat, its spikes are smaller and more often oblong, its flowers have much shorter petals and the seeds are smaller, differently ribbed. Its flowers unfold mid-day, while those of X. smalliana unfold toward evening.

Habitats and Management Implication

This species is in little danger so long as the shorelines of the small lakes and ponds it frequents are not effected physically by the management of surrounding forest. The only competitive vegetation of a woody sort is Hypericum. This, together with a large set of wetlands herbs, appears quite well adapted to the fluctuating waters typical of these karst areas. X. longisepala and associated species are present in great abundance some seasons, are virtually absent others, all depending on the frequency and timing of receding or raising of lake

waters. Shore areas of some of the ponds have in some observed cases been mechanically disturbed so as to prepare for pine plantations. Where such is done these plants disappear as they do also when the smaller ponds are drained so as to increase area for pines and for pasture.

Reference

Kral, R. 1966. Xyris (Xyridaceae) of the Continental United States and Canada. Sida 2(3): 177-269.

SPECIES: #155 Xyris longisepala Kral. Yellow-eyed grass

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								
No Lasting Effect	NA							
Beneficial if Done Properly					NA	--		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Xyris longisepala Kral



XYRIDACEAE

Xyris scabrifolia Harper. Harper's yellow-eyed grass;
yellow-eyed grass

Technical Description

The plants solitary or in small tufts.

Stems.--The plant bases fleshy, bulbous, usually tinted with pink or purple.

Leaves.--Larger leaves linear, to 40 cm long and 5-10 mm broad, twisted, the blades broadening abruptly at the sheathing bases, dull greenish, appearing glazed (examination under hand lens reveals surfaces that are covered by fine tubercles and are thus called papillose). Sheathes of scapes shorter than leaves, the bases chestnut, the tips green like the leaf blades.

Inflorescence.--Scapes linear, stiffish, to 60 cm tall, twisted but erect, toward the tips 2-4-ridged and the surfaces glazed with papillae as in the leaves. Spikes 10-20 mm long, obovoid or ellipsoidal, of many, spirally arranged and tightly overlapping bracts, the tips blunt or acute. Fertile bracts obovate, 6-8 mm long, rounded, nearly entire, the backs rounded, dark reddish-brown or tan depending on age, the dorsal areas from pale green to pale brown.

Flowers.--Lateral sepals hidden by the bracts, linear, the keel narrow, toward its base jagged with thin, irregular teeth and toward its tip fimbriate (drawn out into slender, hair-like, long projections). Petal blades emerging in the afternoon, yellow, nearly round, about 5 mm long. Stamens and staminodes and fruit as in the preceding.

Seeds.--Oblong to ellipsoidal, translucent brown, 0.6-1.0 mm long, finely ribbed.

Distribution and Flowering Season

Moist to wet sandy peats of acid sphagnum bogs or sandy seeps, Coastal Plain, Georgia south to northern Florida, thence west into southern Mississippi.

Special Identifying Features

This rare plant was first described from a small bog in Meriwether County Georgia, where it has not been seen again. It is very similar in appearance to X. platylepis, but differs from it in having the foliage covered by fine tuberculae (warts) or papillae, in having rounder petals, and in having much larger, longer seeds.

Habitat and Management Implication

X. scabrifolia is to be looked for in the small hillside seeps and pitcher plant bogs within the stated area. It is never found on soils that dry out, is generally found rooted in sphagnum peat, mingled with pitcher plants, sundews and other wetland herbs. Its area is probably increased through logging of surrounding wetlands

pinus, so long as this is not accompanied by wholesale drainage. Fire increases it by eliminating competition of woody understory vegetation and the stronger grasses (as is true of most other fire and swamp disclimax forbs). It may persist for a time where the bogs and high hydroperiod savanna it frequents undergoes preparation for (mostly) slash pine plantation. It will disappear if drainage ditches are cut. If such are not made and the pinus are strip planted, it will disappear as soon as the crowns close.

References

Kral, R. 1966. *Xyris of the Continental United States and Canada*, Sida 263: 177-260

Small, J. K. 1933. *Manual of the Southeastern Flora*, p. 254. Chapel Hill, N.C.

SPECIES: #156 Xyris scabrifolia Harper Yellow-eyed grass

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Xyris scabrifolia Harper



ALISMATACEAE

Sagittaria fasciculata E. O. Beal. bunched arrowhead
S. graminea Michx. var. macrocarpa (J.G. Sm.) Bogin

Technical Description

Perennial, rosulate, smooth aquatic herbs, clonalizing by slender, pale, elongate, stoloniferous rhizomes.

Leaves.-- All basal, in flat spirals on a short, soft stem, with two extreme sorts produced; phyllodes appearing first in season, short-linear or slightly gladiate, erect or somewhat spreading, succulently stiff, arechymatous (spongy-tissued), mostly 5-10 cm long, 0.7-2.0 cm wide, bluntly acute with the very tip callused, the margin entire, the surface evidently strongly multi-parallel-nerved with cross-partitions evident, toward the strongly clasping base pale, upwardly becoming a deep but bright green; leaves later in season progressively elongating to 15-35 cm, becoming lorate (still broadly linear toward base but dilating apically) or with elongate, broadly linear, flat petioles and elliptic to lanceolate blades, these frequently 1.5-3.5 (-4.0) cm wide and 1/3-1/4 as long as the petioles.

Inflorescence.-- Verticillate raceme, 1-several scapes arising from the rosette, erect, emergent, teretish, lineal-tapering, mostly 15-35 cm tall, the 2-3 (-4) verticels arising toward the scape tip, the lowest producing female flowers, the upper ones male, the slender pedicels spreading or ascending, usually 3-5/whorl, with female ones longest, to 3 or 4 cm long, each verticel subtended by 3 ovate, papery bracts ca. 4-5 mm long, boat-shaped, spreading-ascending, joined at base into a cup.

Flowers.-- Regular, unisexual; sepals 3, ovate, distinct, in the female somewhat longer (3.5-4.0 mm long) and spreading or reflexed in fruit, thin, pale green with pale, scarious borders sometimes tinged with pink; petals 3, distinct, spreading, obovate, white, ca. 4 mm long; stamens numerous, the broad, flattish filaments ca. 0.3-0.4 mm long, glandular-short-puberulent, the oblong, yellowish anthers erect, ca. 0.8-1.0 mm long; carpels numerous, distinct on an elevated receptacle.

Fruit.-- Akene somewhat laterally compressed, asymmetrically wedge-shaped, ca. 4 mm long, the oblong seed cavity longitudinally lined with prominent, reddish, resinous ridges, and surrounded by a broad thin pale wing, the persistent style projecting laterally as a winged "spur" to 1 mm long.

Distribution and Flowering Season.

Seeps, bogs and swamps, Blue Ridge and southern Blue Ridge escarpment, southwestern North Carolina and northwestern South Carolina; flowering in May, June.

Special Identifying Features.

This non-sagittate-leaved Sagittaria is distinguished from the others of its complex in the southeast (S. rigida, S. teres, S. platyphylla, S. graminea, S. isoetiformis) by a combination of flattened phyllodia, blades of emergent leaves relatively broad but at the same time female pedicels not recurved

(eliminating S. platyphylla), the anther definitely longer than the filament, and the bracts strongly fused.

Habitat and Management Implications

S. fasciculata is presently known from but two counties in North Carolina, one in South Carolina. It is always rooted in shallow water over siliceous and micaceous silty muck in freshwater swamps or bogs in or along shallow languid streams that course through such areas. It may be in full sun or full shade, in the latter case being under Red maple, Nyssa, Alder, Willow, Viburnum, Ilex, Aronia, Rosa. These seep swamps and bogs, often odorous with sulfides, are usually comparatively narrow zones in rises or hills forested by a mixture of hardwoods and pines (both hard and soft). The greatest present threat to the Sagittaria is a compound of such activity as drainage for industrial development, work along highway and railroad rights of way; much of its known habitat has been destroyed in this way. The sensitive habitat may also be threatened by excessive logging of the slopes draining into such bogs, with erosion and subsequent washing of sediments into the areas, thus burying the plants or effecting their supply of water.

References

Beal, E.O. 1960. The Alismataceae of the Carolinas. Journ. Elisha Mitchell Soc. 76: 68-79.

_____. 1977. A manual of marsh and aquatic vascular plants of North Carolina. North Car. Agric. Expt. Sta. Tech. Bull. 247, pp. 60-69.

Radford, A.E., H.E. Ahles and C.R. Bell. 1968. Manual of the vascular flora of the Carolinas, pp. 51-54. Chapel Hill, N.C.

Wooten, Jean W. 1973. Taxonomy of seven species of Sagittaria from eastern North America. Brittonia 25 (1): 64-74.

SPECIES Sagittaria fasciculata E. O. Beal. bunched arrowhead

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	x	x	x		x	NA	?
Damage								
No Lasting Effect					x			
Beneficial if Done Properly								

Other Comments: Site drainage or damming would destroy plants!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Sagittaria fasciculata E. O. Beal



APIACEAE

Sium floridanum Small. Florida water-parship

Technical Description

Perennial, smooth, tuberiferous and rhizomatous herbs.

Stems.-- Strongly decumbent, the stem bent upward to a height of 3-9 dm from a pale, elongate-rhizomatous base (this often producing fusiform tuberiferous rhizomes later in season) arising from a contracted caudex, the lower nodes rooting, the aerial part of the stem somewhat zig-zag, deep green, sulcate (strongly ribbed and grooved).

Leaves.-- Alternate, rather distant, spreading-ascending, the largest lowest, 1-odd-pinnately compound, mostly 1-2 dm long, the lateral leaflets mostly 2-4 pairs, spreading, elliptic, linear-elliptic, or lanceolate, mostly 4-8 cm long, acute, low-serrate, sometimes falciform, the bases sessile or nearly so, oblique, usually acute, the lowest pair much smaller, the terminal leaflet often largest, broadest, on a stalk 1 cm or more long; upper leaf surface deep green, the lower surface paler; petiole elongate, strongly ribbed, expanding to a broad, scarious-margined, clasping base. Lowermost leaves usually withered by flowering time; leaves grading smaller in size progressively into the inflorescence, where mostly much smaller, simple.

Inflorescence.-- Umbels arising from most upper leaf axils, spreading on primary peduncles of various lengths, the lowermost maturing first; primary rays of umbel subtended by 3-5 reflexed, linear-lanceolate, scarious-edged bracts 1 cm long or less, secondary rays mostly 1-2 cm long, spreading, terminating in involucre of bracts similar to those of primary rays, together with the spreading, stiff but slender pedicels, these mostly 5 mm long or less.

Flowers.-- Slightly irregular, bisexual; sepals 5, reduced to minute tubercles less than 1 mm long; petals 5, distinct, the corolla rotate, white, spreading to a width of 2.5-3.5 mm, the blades ovate, somewhat unequal, the largest 2.5-3.0 mm long, acuminate-incurved, the margin somewhat revolute, at base abruptly narrowed to a very short claw. Stamens 5, the filaments at first arched inward, then at anthesis spreading horizontally, slender, terete, ca. 1 mm long, the broadly ellipsoidal anthers ca. 0.3 mm long, yellowish, basifixed, the connective below forming a short-triangular spur; ovary inferior, 2-carpellate, with 2 distinct, spreading, linear styles.

Fruit.-- A smooth schizocarp, the body broadly oblong-ellipsoidal, ca. 3 mm long, 2 mm wide, sometimes curvate, slightly compressed parallel to inflorescence (dorsiventrally), each mericarp strongly 5-ribbed, stylopodium 2-lobed, the lobes forming a low cone, the styles persistent and spreading-recurved, slender, ca. 1 mm long.

Distribution and Flowering Season

Alluvial woodlands, southwestern Georgia, northwestern Florida and contiguous southeastern Alabama. Flowering in June and July.

Special Identifying Features

S. floridanum is treated by Radford et al. (1968) as a part of S. suave Walt. (S. cicutaeifolium Schrank.) , and may indeed represent but a radiate

extreme or a variety. Whatever the case, S. suave is a much taller, coarser plant, usually erect rather than decumbent-based. Its leaves are larger, the leaflets more saliently (projecting) toothed, its inflorescence much broader and with broader involucral bracts, its fruits broader, often longer.

Habitat and Management Implications

S. floridanum forms local populations on sandy-silt of alluvium of rivers and stream bottoms, usually in full shade. The overstory is a mixture of Salix, Fraxinus pensylvanica and F. caroliniana, Planera, various of the willow oaks, overcup oak, basket oak, shumard oak, cherrybark oak, red maple, sycamore, etc. It is amongst understory shrubs such as Hypericum galioides, Myrica carifera, Cephalanthus, Sebastiania, Amorpha. Herbaceous associates include Elytraria caroliniensis, Justicia ovata, Commelina virginica, Micromeria pilosiuscula, Vernonia gigantea, Pluchea, various Panicum, Sagittaria, Peltandra, Rhynchospora miliacea, etc. Logging of the hardwood overstory would, if involving clearcutting, have an adverse effect in that it would elevate the water table, admit too much light, disturb the sandy alluvium in which the rhizomes are found. Single tree or groups selection would, if mechanical disturbance were kept to a minimum, probably not effect adversely.

References

- Radford, A.E., H.E. Ahles and C.R. Bell, 1968. Manual of the vascular flora of the Carolinas, p. 783. Chapel Hill, N.C.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 975-976. Chapel Hill, N.C.

SPECIES Sium floridanum Small. Florida water parsnip

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	NA	NA	NA		X		see note
Damage								
No Lasting Effect								
Beneficial if Done Properly								

Other Comments: Site drainage harmful! S. suave, a related species, is a suspected stock-poisoner.

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Sium floridanum Small



ARISTOLOCHIACEAE

Hexastylis naniflora Blomquist. dwarf-flowered heartleaf

Technical Description

Tufted, smooth, rosulate, spicy-smelling herbs from shallow, thick-rooted rhizomes, these pale, with thin, ovate, scaly bracts, few to several ascending from a more or less erect caudex.

Leaves.-- Alternate, essentially basal from rhizome tips, evergreen (new ones developed toward end of flowering period as old ones die), usually forming a dense, spreading rosette, the blades leathery, orbicular to reniform or broadly ovate, mostly 4-6 cm long, rounded or emarginate, slightly revolute, the bases strongly cordate-auriculate, the upper surface dark glossy green, often reticulately mottled with paler green, the lower surface a dull, pale green; petioles much longer than leaf blades, up to 1.5 dm long, slender, teretish, distally greenish or maroon, proximally paler (when under litter), expanding to clasping pale bases.

Flowers.-- Regular, bisexual, produced singly toward tips of rhizome branches from axils of folded, ovate, scale-leaves on pale, terete, ascending peduncles mostly 3-6 cm long. Sepals 3, joined into a flask-like tube, this short ovoid-cylindric, 0.7-1.0 cm long, slightly broader at its base, there 0.6-0.9 mm wide and cream lined with maroon, distally becoming mostly maroon; calyx lobes ca. 1 cm long, broadly ovate-triangular, spreading-ascending, arching concavely upward, obtuse, the margins broadly revolute, the bases auriculate, the upper surface cream mottled with maroon, puberulent, the backs paler, raised-reticulate. Throat of calyx pilosulous within at its rim, the tube within inconspicuously ridged-reticulate, smooth. Stamens 12, in 2 close-set whorls of 6, erect on very short, stout, pale, fleshy filaments attached to carpel walls or between, the anthers of the set opposite the carpels set somewhat lower, all anthers extrorse, marginal to a broad somewhat flattened connective, the locules 4, each pair linear, 1.5-2.0 mm long, purplish. Carpels 6, lance-ovoid, ca. 1/2 inferior to superior, ca. 5 mm long, joined into a ring from a level just below the fleshy styles downward, the few ovules attached axially at base of locules, the fleshy styles erect, oblong, ca. 2 mm long, bearing round stigmas on the outside at the bases of apical notches.

Fruit.-- Capsules ovoid, few-seeded (usually but 1 ovule/locule), retained in the fleshy calyx tube base and usually released through rotting of the entire structure.

Distribution and Flowering Season

Acidic sandy loam of wooded ravine slopes, Piedmont North Carolina and South Carolina. Flowering in April and May.

Special Identifying Features

H. naniflora has the smallest flowers of any species of its complex in North America, and it might be added, also produces longer peduncles than most. As Blomquist (1957) has stated, its taxonomic affinities are with the "virginica" group, but it differs from any of these in that it lacks a "flare" in the calyx tube which also differs in that it narrows rather than broadens distally.

Habitat and Management Implications

H. naniflora is found on moist to rather dry north-facing slopes of ravines in the Piedmont, usually in the oak-hickory-pine type. The oak species are mostly Q. velutina, Q. falcata, Q. prinus, Q. stellata, Q. alba, Q. coccinea, the hickories usually Carya glabra, C. tomentosa, C. ovalis, the pines mostly P. echinata, P. virginiana. The understory contains Cornus, Cercis, Oxydendrum, but is mostly ericaceous, with Kalmia predominant. Associated herbaceous species are Hepatica americana, Chimaphila, Epigaea, Uvularia, Sanguinaria, Viola, Polygonatum, Polystichum, etc. The Hexastylis plants range in size from a few branching rhizomes to several, the older clumps producing large round tufts of leaves and 20 or more flowers, with the rhizomes and petioles of leaves, usually also the flower stalks buried in unincorporated, moist duff. Generally the plants are around tree bases or under the Kalmia, on steepish slopes along streams. Clear cutting of such slopes would result in considerable mechanical damage to the soils, particularly erosional damage. Also, too much light would be admitted, destroying through bacterial action the organic fraction, drying out and heating up the substrate. No Hexastylis of this species has been observed in contiguous cleared areas. Adjacent pastured woodlands of the same type show few or no plants, probably because of damage done through trampling and subsequent erosion of the slope more than through the plants actually being eaten by livestock.

References

- Blomquist, H.L. 1957. A revision of Hexastylis of North America. Brittonia, 8 (4): 255-282.
- Radford, A.E., H.E. Ahles and C.R. Bell, 1968. Manual of the vascular flora of the Carolinas, pp. 400-402. Chapel Hill, N.C.

SPECIES Hexastylis naniflora Blomquist. dwarf-flowered heartleaf

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	X	X	X		X		X
Damage					x			
No Lasting Effect								
Beneficial if Done Properly							X see note	

Other Comments: overplanting with trees would probably involve considerable soil disturbance, and in such a case would have a negative effect!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Hexastylis naniflora Blomquist



ASCLEPIADACEAE

Matelea alabamensis (Vail) Woodson. Alabama milkvine
Vincetoxicum alabamense Vail
Cyclodon alabamense (Vail) Small

Technical Description

Perennial, milky-juiced, twining herbaceous vine from a fibrous rootstock.

Stems.-- 1-3 from a stout, erect, fibrous-rooted rhizome, prostrate or twining on shrubs or trees, to several meters long, simple or branching, terete, pale green or tinged with maroon, from nearly smooth to hirtellous, sometimes with a scattering of long, spreading, yellowish trichomes, the newer growth often also with an admixture of short-stalked to sessile, reddish glands.

Leaves.-- Opposite, the petioles stiffly spreading, mostly 3-5 cm long, slender, the upper side somewhat concave, the lower side rounded, the surface yellow-green or maroon, scattered-hirsute, also with a scattering of shorter eglandular and glandular hairs mixed with some sessile glands; blades ovate to suborbicular, 5-10(-15) cm long, apically acuminate or acute, rarely narrowly rounded or even emarginate, entire, the base cordate or auriculate with the sinus narrow or closed, the upper surface deep yellow-green, sparingly to copiously hirtellous, the short, erect hairs swollen-based, the lower surface usually more copiously hirtellous, particularly along the veins, and also along the veins often with sessile or short-stalked glands.

Inflorescence.-- Umbels usually 1/node from the upper nodes, subtended by an involucrel of a few, small, lance-linear, hirtellous, green bractlets, on spreading, strongly ribbed, hirtellous and glandular peduncles 1.0-1.5 cm long, the slender rays (pedicels) usually few (mostly 2-5), spreading, slender but stiff, hirtellous and glandular.

Flowers.-- Bisexual, regular, rotate, flattish, ca. 2.5 cm wide across the petals; sepals 5, joined at very base, the triangular lobes spreading, ca. 3 mm long, acute, pale green, hirtellous, also with sessile and stalked glands; corolla lobes 5, spreading, flat, ca. 8-9 mm long, elliptical or narrowly ovate, the tips narrowly rounded, sometimes slightly emarginate, the margins entire, the surface greenish yellow with a reticulum of deeper green, above glabrous, beneath hirtellous and glandular; gynostegium (a weld of stamen and female parts) surrounded at base by a fleshy, orangish disc, this with 5 conical, suberect horns opposite the 5 calyx lobes and forming peripherally a thinnish, irregularly and shallowly 5-lobed, strongly erose fringe; gynostegium elevated above the perianth base ca. 1 mm, yellow-green, the truncate apex ca. 3 mm wide, obscurely pentagonal, nearly covered by 5, thin broadly triangular, inflexed flaps of anther tissue; anther apparatus consisting of 2 saclike pollinia (masses of pollen) connected by a yokelike pair of arms (translocator) spreading from a lense-like "chitinous" gland (corpusculum) located at the apex of a vertical slit (the interstaminal slit); ovaries 2, superior, connivent to form a single style apically, this expanded distally to form a peltate stigma (most of the gynostegial head!) which is receptive in 5 radial lines beneath

and opposite the glands.

Fruit.-- Follicles yellowish-green, lance-ovoid, muricate, ca. 10 cm long; seeds numerous, flattish, obovate in outline, brownish, erose-margined, bearing a white "coma" of long, thin hairs at the narrow end.

Distribution and Flowering Time

Wooded, steep or gradual ravine slopes, Coastal Plain, southwestern Georgia, northwestern Florida, and southeastern Alabama; flowering from late May into June.

Special Identifying Features

The above description of the floral structure is adapted from the excellent treatment of southeastern Matelea done by Dr. D. Drapalik (1970), the undisputed authority on these species. Of the 9 taxa found in the south-east only 2 have the corona and coronal appendage tips at a level below the gynostegial head; these 2 are M. alabamensis and M. gonocarpa, which have very different looking flowers, with the strongly reticulate, broader petals of the former in strong contrast to the narrower, not evidently reticulated petals of the latter; the coronal apparatus is entirely different. The ovary and fruit of the former are muricate, those of the latter smooth. Superficially, flowers of M. flavidula are very like those of M. alabamensis, the petals being strongly spreading, flat, similar in outline, yellow green with dark green reticulation as in M. alabamensis and the fruit similar. However the corona and appendages of M. flavidula extend to a level above the gynostegial head.

Habitat and Management Implications

M. alabamensis is perhaps one of the rarest herbs in the southeastern U.S., with less than 10 localities ever having been known, and not now found at most of these. Therefore information about precise localities is kept confidential.

The plants, in the one area where they are fairly numerous today, are found on gentle east, south and west slopes in what is, or was, part of a beech-magnolia-maple system. In addition to these the overstory has oaks such as Q. hemisphaerica, Q. nigra, Q. alba, Prunus serotina, Nyssa, Carya cordiformis, C. glabra, Tilia, Liquidambar, with a scattering of Pinus echinata, P. taeda. In the understory are Cornus florida, Ostrya, Carpinus, Prunus umbellata, Rhus copallina, with Vaccinium elliotii, V. arboreum, Sebastiania, Rhus toxicodendron and lianas such as Parthenocissus, Vitis, Rhus radicans, Anisostichus, Campsis are common. The soil is a fine sandy loam and is usually moist, definitely not wet. Such herbs as Hexastylis arifolia, Trillium underwoodii, T. catesbaei, Spigelia, Carex, Polygonatum, Sanguinaria are present. The Matelea vines appear to occupy the edges of the deeper stands of forest or where the trees are well spaced, or where there has been some evidence of recent logging or other disturbance. This appears to agree with information on labels of specimens collected from other localities. It also appears that as such disturbed areas are gradually overgrown by returning woody vegetation the Matelea vines quit flowering, under increasing shade gradually lose vigor, and finally are suppressed entirely.

From this it might be assumed that selective logging of the sort that did little damage to the understory or to the substrate might actually benefit. Controlled light burning might be beneficial. However, these plants are so rare that recommendations for their monitoring and management ought best to come from Dr. Drapalik himself.

References

- Drapalik, Donald. 1970. A biosystematic study of the genus Matelea in the southeastern United States. Unpublished Ph.D. Thesis, University of North Carolina at Chapel Hill.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1075-1076, Chapel Hill, N.C.
- Vail, Anna M. 1899. Studies in the Asclepiadaceae, Bull. Torr. Bot. Club 26: 423-431.
- _____. 1903. Studies in the Asclepiadaceae VII. A new species of Vincetoxicum from Alabama. Bull. Torr. Bot. Club 30: 178-179.
- Woodson, R.E. 1941. The north American Asclepiadaceae I. Perspective of the genera. Ann. Mo. Bot. Gard. 28: 193-244.

SPECIES Matelea alabamensis (Vail) Woodson. Alabama milkvine

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage						X		
No Lasting Effect								
Beneficial if Done Properly	X				X			

Other Comments: plants not used by stock, but can be damaged by them.

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Matelea alabamensis (Vail) Woodson



ASPIDIACEAE

Thelypteris pilosa (Mart. & Gal.) Crawford var.
alabamensis Crawford. Streak-sorus Fern
Gymnogramma pilosa Mart. & Gal.
Dryopteris pilosa (Mart. & Gal.) C.Chr.
Lastrea pilosa (Mart. & Gal.) Copeland
Leptogramma pilosa (Mart. & Gal.) Underwood var.
alabamensis (Crawford) Wherry

Technical Description

Rather delicate, lowish fern from a slender, short, yellow-pilosulous and reddish-brown-scaley rhizome, the rhizome scales reddish-brown, lustrous, scattered pilosulous toward base, 1 cm or less long, lanceolate, attenuate.

Fronds.-- Close-set on the short rhizome, usually appearing clustered, the stipe slender, erect to ascending or spreading, brownish toward base, upwardly becoming green, slightly angulate, pilose throughout, 1-3 (4-8) cm long; blade 3.5-10.0 (-15) cm long, 1.5-3.0 cm broad, ovate-lanceolate to lance-or-elliptic-oblong, usually broadest at middle or below, 1-pinnate, the lower pinnae separate, short-stalked, narrowly to broadly ovate, elliptic or suborbicular, rounded-tipped, entire to sinuate or sinuately toothed or lobed, upward becoming sessile, then fused basally so that toward tip the frond is pennately lobed, at very tip shallowly lobed or serrate-dentate; upper surface of blade yellow-green, dull, scattered strigose-pilose, densely so along the veins and midrib; lower surface of blade slightly paler, similarly pilose; venation of pinnae pinnate, a central vein extending to pinna-tip, laterals to each lobe (tooth) tip as well as to each sinus; sori short to elongate-linear, the sporangia rather loosely and medially arranged along the branch veins of the pinnae.

Distribution

Shaded bluffs along the West Fork of the Sipsey River, Bankhead National Forest, Winston County, Alabama; also Chihuahua, Mexico.

Special Identifying Features

This species differs from the other Thelypteris of the southeast in having no indusium. It differs from T. pilosa var. pilosa, a widespread species in Mexico and Central America in being an overall smaller plant, the pinnule tips rounded (rather than acute!), the sinuses of pinnule margins reached by but 1 lateral vein (rather than by 2).

Habitat and Management Implications

T. pilosa var. alabamensis grows on shaded moist ledges of Pottsville Sandstone which forms massive bluffs in places along the Sipsey River. For several years it was presumed extinct in that it had been known only from the type locality 5 mi. east of Double Springs on the Sipsey and this locality had been destroyed by bridge construction. Recently however, it has been found in a few, isolated localities along the same stream, the populations generally small, consisting of few plants each. In that the area where the ferns have been found is in National Forest and the river itself

is there protected, this fern, because of its small size, because of the steepness of its habitat, should escape much damage save by overactive collectors of ferns. These plants are usually much smaller than dimensions given them by Wherry (1964), usually are scattered in moss and liverwort mats in the crevices of the bluffs. Shade is provided by a bluff and ravine forest of hemlock, various cove-type hardwoods including Quercus rubra, Q. alba, ash, tulip poplar, elm, maple. Betula lenta, etc. Habitat for this rare fern is maintained by a combination of high humidity, high substrate moisture, and shade, the humidity provided by evaporation from the stream, the substrate moisture by seepage over the sandstone and bryophyte mats, the shade by overhanging branches of trees which also tend to trap the moist air. Danger to the fern could come from logging of the bluff woodlands, this admitting too much light, reducing humidity, thus generally contributing to a drying out and destruction of the habitat.

References

- Copeland, E.B. 1947. Genera Filicum, the genera of ferns. Chronica Botanica Company, Waltham, N.Y.
- Crawford, L.C. 1951. A new fern for the United States. Amer. Fern. Journ. 41: 15-20.
- Dean, Blanche E. 1969. Ferns of Alabama, rev. ed. pp. 105-106. Southern University Press.
- Knobloch, I.W. and D.S. Correll. 1962. Ferns and fern allies of Chihuahua, Mexico. Renner, Texas.
- Wherry, E.T. 1964. The southern fern guide, p. 86. New York.

SPECIES Thelypteris pilosa (Mart. & Gal.) Crawford var.

alabamensis Crawford. streak-sorus fern

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	NA	NA	NA	x	x	NA	NA
Damage								
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Thelypteris pilosa (Mart. & Gal.) Crawford
var. alabamensis Crawford



ASPLENIACEAE

Phyllitis scolopendrium (L.) Newm. American hart's-tongue fern

Scolopendrium vulgare Sm.

Phyllitis scolopendrium var. americana Fern

Technical Description

Perennial, evergreen fern from a shortish, stout, ascending caudex-like rhizome.

Fronds.-- Few to several, closely and spirally clustered at rhizomal crown, simple-bladed, the blades spreading or ascending in a rosette, strap-like (oblong-linear to linear-panduriform), mostly 1-3 dm long, mostly 2-5 cm wide, apically short-acuminate, acute or rounded, rarely bifurcated, in any case the tips bluntish, the margin thin, somewhat revolute, entire or sinuate, the fresh surface pocketed-crispate, the blade base usually prominently auriculate; surface above a glossy deep green, beneath paler, duller; veins pinnate, few-forking, free, their tips enlarged to form linear "foveolae" (visible on upper surface) extending to ca. 1 mm from margin; stipe dark glossy brown, stoutly linear, between 1/3 and 1/4 as long as the blade, with a brush of reddish-brown, narrowly-triangular-attenuate scales, these longest and most abundant at stipe base, reduced in size and patchy upward, denser again on the lower surface of the frond along base of midrib of blade, sometimes to near its apex; sori linear, double but each pair so close as to appear one, the "pairs" regularly and pinnately arranged from near blade base to near summit or on the distal 1/2-1/3, mostly 0.5-1.5 cm long, shorter often alternating with longer; indusia pale-membranous, lateral to each of a sorus "pair", 1 flap usually slightly overlapping the other over the crest of the compound sorus.

Distribution

Cool, moist to dryish shaded faces of calcareous rock or shade, in North America very rare and local from New Brunswick and Ontario southward to central New York state; in the southeastern area known now only from Marion County, Tennessee, Northern Alabama and Mexico.

Special Identifying Features

P. scolopendrium is monotypic, perhaps may be distinct as a variety of the more abundant European entity (this infrequently naturalized in eastern North America), which tends to be in all ways a larger plant with scales of stipe more uniformly disposed along the stipe, the larger ones admixed with smaller, narrower ones, and with longer, broader sori. Unlike the American example, the European plants are said to be abundant in many parts of Europe, almost weedy, on rock fences, in rocky pastures and hedgerows.

Habitat and Management Implications

At one time there were only 2 known stations for the hart's-tongue fern in the southeast, both in Tennessee, in Marion and Roane counties, the latter

now destroyed. In that the only recent observations of it have been made in the Marion County locality, a limesink and falls near South Pittsburg, the following habitat observations are confined to the writer's experience with that locality. The Phyllitis juts from the steep sides and overhang of a narrow deep sinkhole in limestone. The substrate is almost always moist, is often wet, covered with a mat of bryophytes, and is usually both shaded and cool, consisting either of rockface or the sticky clay weathered from it. The visible sporophytes are usually few, most of them now confined to the most inaccessible part of the sinkhole, namely the lower part of and overhang adjacent to the lip of a waterfall. Fortunately for the fern the only way a collector could reach the few plants would be by his being lowered by rope or rope ladder. There are several previous reports of this South Pittsburg population, beginning with the late 1800's and the earliest indicate that it was then much more abundant, extending even to the floor of the sink. Since then, reported numbers of sporophytes have varied widely, but in general show a decline. None are now seen on the sink floor or toward its rim. Complicating matters still further is the fact that Mr. E.W. Graves (according to Ms. Eleanor McGilliard, 1936) spread spores of Ontario plants in the area so that at least some of the specimens now seen may have developed from that source. However, the hart's-tongue fern still exists in one southeastern locality. It is maintained there by the unique habitat which provides a combination of shade of mixed hardwoods, high and nearly constant moisture of substrate, and high humidity created by the spray from falling and seeping water. There is relatively little fluctuation of the cool temperature in summer. This habitat is so sensitive that any type of human activity in the immediate area involving mining or logging machinery would doubtless trip the balance toward extirpation.

References

- Fernald, M.L. 1950. Gray's manual of botany, ed. 8, p. 42. New York.
- Graves, E.W. 1911. The hart's-tongue in Tennessee, 1878-1935. Amer. Fern Jour. 26 (4): 113-122.
- McGilliard, E. 1936. The hart's-tongue in Tennessee, 1878-1935. Amer. Fern. Journ. 26 (4): 113-122.
- Shaver, J.M. 1954. Ferns of Tennessee, pp. 105-112. Nashville, TN
- Small, J.K. 1938. Ferns of the southeastern United States, pp. 148-150. New York.

SPECIES Phyllitis scolopendrium (L.) Newm. American hart's-tongue

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	NA	NA	NA	X	X		
Damage								
No Lasting Effect								
Beneficial if Done Properly								

Other Comments: known localities should be "insulated" by a wide totally protected zone!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Phyllitis scolopendrium (L.) Newm.



ASTERACEAE

Coreopsis intermedia Sherff. golden-wave tickseed

Technical Description

Thick-rooted perennial herb increasing by lateral shoot buds from a stout caudex.

Stems.-- 1-several, erect or ascending, mostly 6-10 (-15) dm long, stiffish and brittle, toward base nearly terete, pale brown or purplish-brown, sparsely puberulent or hirsutulous, upwardly becoming greenish, the internodes strongly ribbed or sulcate, simple or sparingly branched below the inflorescence.

Leaves.-- Opposite; lowest leaves usually withered by flowering time, close-set, simple (or trilobed with terminal lobe largest), as long or longer, slender, but clasping-based; leaves higher on stem becoming sessile or short-petiolate, all simple and unlobed, the largest at about midstem, spreading, rather distant, firm (slightly fleshy), elliptic, oblong, lanceolate or oblanceolate, to 7 cm long, the tips obtuse or rounded, the margin with a somewhat paler, thickened, puberulent, entire edge, the base short-attenuate, broadly cuneate or rounded-clasping, the upper surface yellow-green, puberulent to nearly smooth, the lower surface paler, puberulent to smooth; leaf size diminishing gradually to the inflorescence base, thence rather abruptly smaller, the bracts distant or absent in the inflorescence.

Inflorescence.-- Heads rather few, solitary at tips of upwardly arching to erect, smooth to slightly puberulent, strongly ribbed peduncles, these mostly 6-20 cm long and usually bractless or with bracts only at very base. Heads (involucres) at anthesis broadly campanulate, mostly about 1.5-2.0 cm wide across the phyllaries, ca. 1.5 cm high (from base to tips of inner phyllaries), the phyllaries essentially in 2 series with the outermost distinct, lanceolate, 8-10 mm long, greenish and multinerved, with narrow but firm, cartilaginous and bristly tips, marginally pale-banded, ciliate, the backs smooth; inner phyllaries broadly lanceolate or narrowly ovate, erect, mostly 12-15 mm long, orange-yellow, the tips narrowly rounded, minutely ciliate, the margins entire, thin, the surfaces smooth; chaff of elevated receptacle mostly 6-8 mm long, firm-papery, linear-lanceolate, whitish, with subulate, brownish tips, the backs slightly convex, with 1-2 brown, medial bands.

Flowers.-- Ray florets 8-10, the corollas spreading, clear yellow, the tube ca. 2 mm long, the blade broadly obovate-cuneate, 2.5-3.0 cm long, the broad apex irregularly and rather coarsely toothed; ovary apparently infertile, oblong-linear, ca. 4 mm long, flattened, bearing at apex a pair of low, lacerate pappus scales; disc florets numerous, fertile, the tubular-narrowly campanulate corollas ca. 5 mm long, the tube and throat yellowish-white, with 5 reddish lines, and 5 short-triangular, slightly spreading, deeper yellow, red-margined lobes. Style branches short-spreading, apically minutely glandular-bristly with short, narrowly conic appendages. Pappus consisting of 2 (sometimes more) small, erect, pale, triangular, 3-winged, acutish scales.

Fruit.-- Akenes mostly broadly ovoid to nearly round, mostly 2.5 mm long and nearly as broad or broader, inwardly curvate, deep reddish-brown, the

convex backs strongly tuberculate, the inner face forming a membranous entire-margined cup around the obovate seed cavity whose surface is strongly tuberculate and which bears marginally a strong, broad, purplish-brown, thin, entire, erose or pectinately fringed wing-border.

Distribution and Flowering Season

Sands or sandy loams of open woods, sandy fields and roadsides, northeastern Louisiana and northeastern Texas. Flowering mostly in May and June.

Special Identifying Features

C. intermedia is closest taxonomically to C. pubescens Ell., a widespread species mostly of the interior provinces in the southeastern U.S. and in the Ozarks. However, the range of the former is nested within, does not overlap, that of the latter (so far as present records indicate). It is to be distinguished from C. pubescens by its fleshier, firmer leaves, which tend toward the plant base to be entire, less often pinnate, and by its longer range of peduncle lengths. Hybrids between it and C. pubescens have been synthesised by Dr. E. Smith, as have hybrids between it and C. grandiflora (with highest pollen stainability) and C. nuecencis (Smith, 1976).

Habitat and Management Implications

C. intermedia is most abundant on deep sand soils, in open oak-hickory or oak-hickory-pine woods or on sandy clearings in such woods. The soil, if not a nearly pure sand, is but slightly humified, and generally rather dry. The oaks are mainly Q. stellata, Q. margaretta, Q. marilandica, Q. falcata, Q. incana, the hickories Carya texana, C. tomentosa, the pines P. echinata, P. taeda, the understory mostly of Cornus florida, Vaccinium arboreum, Sassafras, Tow bush blueberry, etc. Sandhills herbaceous species such as Froelichia, Poronochia, Berlandiera, Tetragonatheca, Stillingia, Cenchrus, Cnidocolus, Penstemon (murrayanus) are common. The hardwood forest is of relatively low quality, being best suited for growth of pine, which is plantation managed through much of the area. Clear cutting, even accompanied by considerable soil disturbance, would favor increase of this species through creating more light. The region has a history of fire, this probably the disturbance factor which has over time created openings for C. intermedia to occupy.

References

- Sherff, E.E. 1926. New or otherwise noteworthy Compositae III. Bot. Gaz. 88: 285-309.
- Smith, E.B. 1976. A biosystematic survey of Coreopsis in eastern United States and Canada. Sida (3): 123-215.

SPECIES Coreopsis intermedia Sherff. golden-wave tickseed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy							X	
Damage								
No Lasting Effect		X	X	X				
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Coreopsis intermedia Sherff



ASTERACEAE

Helianthus smithii Heiser. Smith's sunflower
H. parviflorus var. attenuatus A. Gray

Technical Description

Perennial, fleshy-rooted, from short, ascending rhizomes and from crown buds.

Stems.-- Erect, solitary or few, simple or sparingly branched below the inflorescence, terete or slightly ribbed, mostly 8-15 dm high. ca. 5 mm thick at base, mostly smooth save in inflorescence branches, glaucous, purplish or reddish-brown, brittle.

Leaves.-- Lowermost usually absent by flowering time, of those present the lower ones opposite, rarely alternate, upward on stem becoming alternate, with the largest at about mid-stem, the blades mostly narrowly to broadly lanceolate, firm, narrowly acuminate, the margins entire, often revolute, the bases cuneate, then attenuated on spreading petioles 1.5 cm long or less; upper blade surface deep yellow-green, harsh, the lower surface paler, densely golden-gland-dotted, the midrib strongly raised, strigose, the lateral veins pinnate, less conspicuous, less strigose, the surfaces between major veins usually smooth or with a wide scattering of short, appressed hairs.

Inflorescence.-- Heads numerous, in cymes, the major inflorescence branches slender, elongate, arching upward from axils of most upper leaves and with most heads produced on hairy peduncles toward the strigillose branch tips; heads mostly campanulate, ca. 1 cm high and nearly as broad across the phyllaries, the phyllaries several, loosely imbricated in several series, foliaceous, the smallest outermost and loosest, the tips often spreading, lance-linear, attenuate, the larger ones oblong-lance-ovate, narrowly nerved, smoothish; receptacle conic, the phyllaries grading into pales of similar length but oblong, firmer, browner, more strongly ribbed and apically often tridentate, the upper margins ciliate, the backs villosulous distally.

Flowers.-- Ray florets mostly 6-10, the ligules 1.0-1.5 cm long, spreading, pale yellow, elliptic-linear, ciliate. Disc florets numerous, the corollas yellow, ca. 4.5 mm long, the short tube abruptly expanded to a narrowly campanulate throat, thence into 5, spreading-ascending, short-triangular teeth.

Fruit.-- Akenes oblong-obovoid, somewhat flattened parallel to phyllaries, ca. 4 mm long, 2 mm wide, dark brown, bearing at the truncated apex 2 pale, lance-subulate, ciliate, pale scales to 2 mm long.

Distribution and Flowering Season

Dry sands or sandy clays of upland oak-pine-hickory woods, southern Appalachians, southeastern Tennessee, southwestern North Carolina, north-eastern Georgia and in Alabama in the eastern mountain ranges south along the east side of the state through the Piedmont into the upper Coastal Plain. Flowering from August to frost.

Special Identifying Features

H. smithii most resembles, in fact produces intermediates with, H. microcephalus,

a common small-headed sunflower of dry sunny uplands throughout the south-east. However, that species has longer petioles (1.5 cm or more), with heavily to lightly puberulent lower leaf surfaces. In appearance H. smithii is actually closest to H. laevigatus, a rather rare sunflower of the inner Piedmont and eastern Blue Ridge of the Carolinas, also western Virginia. That species, so similar in leaf and head, however lacks the resin atoms on the lower surfaces of its leaves, whose upper surfaces are nearly smooth, rather than scabrid.

Habitat and Management Implications

H. smithii, according to Dr. Heiser in his recent monograph of the genus (1969), is quite rare. However, Cronquist (1977) has turned up several more specimens from recent collections of Helianthus from the southeast; it actually may be relatively abundant locally in the mountains of eastern Alabama. It is a plant of well drained, dryish, sands, sandy loams, or sandy clay loams, usually in open oak-hickory-yellow pine uplands. The pine species are usually P. echinata, P. taeda, P. palustris, P. virginiana, the oaks Q. prinus, Q. coccinea, Q. velutina, Q. falcata, the hickories Carya tomentosa, C. glabra, C. ovalis, C. pallida. Understory is usually made up of Cornus florida, Running oak (Q. stellata var.), Viburnum, with an admixture of both high and low bush blueberries, Rubus, Smilax. Herbaceous associates are the usually dry upland summer and fall flowering Desmodium, Lespedeza, Stylosanthes, Strophostyles, Potentilla, Lechea, Scutellaria, Agalinis, etc. In areas where cutting of the overstory has been extensive, H. smithii behaves as a weed as do other perennial sunflowers in the same sites (H. hirsutus, H. divaricatus, H. microcephalus, etc.) It may abound locally in areas cleared and bulldozed for pine plantation, though, being a sun plant, it is most likely shaded out as crowns close. It is in such disturbed sites that it is producing hybrids with H. microcephalus. Fire is a historical factor in the forest types H. smithii. It frequents and probably tends to increase the species by reducing woody competition.

References

- Cronquist, A. 1977. Notes on the Asteraceae of the southeastern United States. *Brittonia* 29 (2): 217-225.
- Heiser, C.B. with D.M. Smith, S.B. Clevenger and W.C. Martin. 1969. The North American sunflowers. *Mem. Torr. Bot. Club* 22 (3). 218 pp. illust. Durham, N.C.

SPECIES Helianthus smithii Heiser. Smith's sunflower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy							X	
Damage								X
No Lasting Effect		X	X	X				
Beneficial if Done Properly	X				X	X		

Other Comments: invades mechanically disturbed areas!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Helianthus smithii Heiser



ASTERACEAE

Heterotheca ruthii (Small) Harms. Ruth's golden-aster
Chrysopsis ruthii Small
Pityopsis ruthii (Small) Small

Technical Description

Tufted perennial herbs with slender, stoloniferous rhizomes.

Stems.-- Few to several, erect to ascending or decumbent, stiffish, terete, the bases with brownish, scaly, old leaf bases, throughout silvery-white with copious, long, appressed hairs, these admixed above on stem with short, spreading, peg-like, glandular hairs; branches few to several, upwardly arching, departing from mid-stem upward.

Leaves.-- Numerous, overlapping, in tight spirals, linear-lanceolate or gladiate, ascending or erect, mostly 2-5 cm long, narrowly acute or acuminate, entire, the bases attenuate, clasping, the surfaces silvered with long, appressed hairs.

Inflorescence.-- Of few to several heads in a cyme, the peduncles usually longer than the heads, upwardly arching, copiously spreading-glandular-hairy; heads broadly campanulate, about 1 cm high (from base to tip of disc), about 1 cm broad across top of involucre; involucre bracts lance-linear, the longest 7-8 mm long, attenuate-tipped, loosely overlapping in several series, the outermost shortest, all green with broad, pale, ciliate margins, the backs sessile-glandular.

Flowers.-- Ray florets mostly 10-15, the pappus of numerous capillary dull-white bristles, 4-5 mm long, the corollas yellow, with flattish claws ca. 3 mm long and spreading, linear-elliptic or oblanceolate blades 6-7 mm long; disc florets numerous, the pappus similar to that of rays, the corollas yellow, tubular, ca. 5 mm long, the slightly expanded throat divided into 5, triangular, erect or slightly spreading lobes.

Fruit.-- Akene lance-fusiform, 3.5-4.0 mm long, slightly ribbed, slightly compressed, the base and middle silvery-hairy, the narrowed apex smooth, the surface pale brown.

Distribution and Flowering Time

Rocky sunny bars and banks, also exposed ledges, along the Hiwassee River in Polk County, Tennessee; flowering from September to frost.

Special Identifying Features

Heterotheca ruthii is distinguished from the other grass-leaved members of its section (Pityopsis) by a combination of characters including the comparatively short, overlapping leaves which show little gradation in size from base to apex of stem, together with the glandular nature of the pubescence of peduncles, inflorescence branches, and involucre bracts. H. aspera, of the lower Gulf Coastal Plain has a similar glandular pubescence but has

longer basal leaves, a taller habit, and narrower heads.

Habitat and Management Implications

This very localized endemic grows only on exposures of phyllitic rock in and along the Hiwassee River upstream from Reliance and locally along the Ocoee in the same county. Usually it is in shallow moist soil pockets in cracks of the rock, associated with grasses and sedges in full sun. It is often on rocky bars in the stream itself. Damage to the habitat must have been already done by construction of a railroad along the south banks of the stream. Fluctuating stream levels because of sporadic releases from upstream damming on both streams have probably also served to reduce it through "flushing" away plants or inundating them. Logging of the cove hardwoods, hemlock, and scattered soft and hard pine of the ravines and slopes along the river has probably not been as disastrous as has the water "management" in the area.

Plants have been cultivated successfully from seed by Dr. R.E. Farmer (1977) who regards H. ruthii, when grown under artificial conditions, a good horticultural species.

References

- Bowers, F.D. 1972. The existence of Heterotheca ruthii (Compositae) Castanea 37: 130-132.
- _____. A taxonomic revision of Heterotheca sect. Pityopsis. Unpublished Ph.D. Thesis, Univ. of Tennessee.
- Farmer, R.E. 1977. Seed propagation of Heterotheca ruthii. Castanea 42 (2): 146-149.
- Harms, V.L. 1969. A preliminary conspectus of Heterotheca sect. Pityopsis. Castanea 34: 402-409.
- Small, J.K. 1897. Studies in the botany of the southeastern United States XII. Bull. Torrey Bot. Club 24: 493.
- _____. 1933. Manual of the southeastern flora, pp. 1340-1342. Chapel Hill, N.C.

SPECIES Heterotheca ruthii (Small) Harms. Ruth's golden-aster

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	NA	NA	NA			X	
Damage								
No Lasting Effect								
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Heterotheca ruthii (Small) Harms



BRASSICACEAE

Draba aprica Beadle. open-ground whitlow-grass

Technical Description

Taprooted winter annual.

Stems.-- 0.3-3.5 dm high, rarely branched below the middle, soft, slender but stiffly erect, terete, low-ribbed, toward the base purplish, at mid-stem and above greenish, throughout stellate-pubescent, the hairs whitish.

Leaves.-- Both rosette and cauline produced. Basal leaves spatulate to elliptic, ovate or suborbicular, the tips obtuse to rounded, the margins entire to few-and-low toothed (2-4 pairs), the bases gradually or abruptly attenuated to definite, spreading petioles; stem leaves alternate, spirally arranged, distant or slightly overlapping, erect, sessile or short-petiolate, the blades mostly oblong, elliptic-linear or broadly linear, the largest (to 2.5 cm long) toward the stem base, gradually reduced in size and tending to be entire upward toward and in the inflorescence.

Inflorescence.-- Racemose, often with short indeterminate racemes born from axils of most upper leaves but the longest terminal, elongating (in robust plants) to 3-5 cm; pedicels at anthesis ca. 2-3 mm long, spreading-ascending, elongating in fruit to 4-5 mm, and becoming rather distant as the raceme elongates.

Flowers.-- Regular, bisexual; sepals 4, erect, distinct, oblong-cymbiform 0.8-1.0 mm long, yellowish-green, tending to fall early from the young fruit, the backs stellate-pubescent; petals 4, erect to somewhat spreading, 2.2-2.5 mm long, clawed, white, the blades broadly ovate or obovate, the apex rounded, the base attenuated gradually or abruptly to the claw; stamens 6, 2 shorter, all shorter than the petals, the filaments white, slender, the nearly round anthers yellow; ovary 2-carpellate, oblong, laterally flattened parallel to the partition, superior, green, stellate-pubescent, the style to 0.2 mm long.

Fruit.-- Siliques linear-elliptic, 4-6 mm long, stellate-hairy. Seeds (2-) (4-6) (-8), flat, asymmetrically triangular, brown, ca. 1 mm long, borne in 2 (opposite) rows.

Distribution and Flowering Time

Shallow, usually highly sandy soils over arenaceous (siliceous) rock, very local, Piedmont South Carolina and Georgia; Ozarks of Arkansas; southeastern Missouri, eastern Oklahoma. Flowering April into June.

Special Identifying Features

D. aprica is taxonomically nearest D. brachycarpa Nutt. ex T. & G. but differs in the dense stellate-hairiness of its fruit. The two species grow together on the summit of Kennesaw Mountain in Georgia (the type locality) and it can be seen there that D. brachycarpa is first to bloom, mostly being in full fruit by the time flowers of D. aprica are full. As is true of several Draba, D. aprica flowers are petaliferous during the early period of flowering but tend to lack them later in the flowering season.

Habitat and Management Implications

D. aprica frequents organic sands of shallow soils over siliceous rock (mostly granites or sandy shales). These soils are subject to rapid drying, are often covered by mosses, lichens annual grasses and annual forbs such as Krigia virginica, Viola rafinesquii, Arabidopsis, Plantago virginica, etc. The plants are either in full sun or are in the light shade of Rhus, Forestiera, Prunus, Juniperus, certainly not in closed forest. The over-story is primarily oak-hickory-pine, with oaks (Q. stellata, Q. marilandica, Q. falcata, Q. coccinea, Q. prinus) predominant. Soils on which this Draba succeeds are usually too thin to support large trees, the cover thus being a scattering of shrubs including (in addition to those already mentioned) Amorpha, Vaccinium arboreum, Chionanthus, Celtis tenuifolia, etc. While fire is part of the vegetational history of this type, no observations have been made as to how this factor would effect the abundance of D. aprica. Evidently succession to total forest cover would shade it out. The species is small, perhaps its small size and the very local nature of its populations being the reasons for its declared rareness. Whenever this species has been observed over time it persists, even though annual, but appears to spread very little.

References

- Fernald, M.L. 1934. Draba in temperate northeastern America. *Rhodora* 36: 361-363
- Small, J.K. 1913. Flora of the southeastern U.S., ed. 2 1136-1375
- _____. 1933. Manual of the southeastern Flora, pp. 565-566, Chapel Hill, N.C.
- Radford, A.E., H.E. Ahles and C.R. Bell, 1968. Manual of the vascular flora of the Carolinas, pp. 489-490. Chapel Hill, N.C.

SPECIES Draba aprica Beadle. open ground whitlow-grass

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			X	not
Damage								obs.
No Lasting Effect								
Beneficial if Done Properly	?				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Draba aprica Beadle



CISTACEAE

Hudsonia ericoides L. ssp. montana (Nutt.) Nickerson & Skog.
golden mountain heather
H. montana Nutt.

Technical Description

Low, much-branched shrub from a short, thick crown, the roots thickish.

Stems.-- Numerous, decumbent-based, often rooting at lower nodes, producing abundant spur shoots, the side branches arching upward, the whole plant forming a dense, often circular mat, the old shoot growth with bark dark reddish-brown, with numerous irregular narrow cracks revealing paler inner bark, the newer shoots with epidermis more reddish, the newest growth pale reddish-brown or tan, pilose.

Leaves.-- Alternate, ascending and overlapping in tight spirals from base to tip of shoots and spur shoots, linear, mostly 3-8 mm long, sometimes curved, greenish, firm, somewhat thickened, toward the base above somewhat concave, toward the apex thicker, the tips with a conic callus, the surfaces at first pilose, later nearly smooth.

Inflorescence.-- Flowers few to several, solitary from the tips of shoots and spur shoots, on slender, erect or ascending, pilose-tomentose peduncles mostly 5-10 mm long.

Flowers.-- Bisexual, regular; calyx turbinate, 5-7 mm long, the 5 sepals unequal, fused at base to a cup, the 2 longest lobes linear-subulate, the others lance-ovate, acuminate, the outer surface pilose-tomentose; petals 5, distinct, pale yellow, spreading, twice as long as the sepals; stamens distinct, smooth, up to 25, ca. 3 mm long, the anthers broadly ellipsoidal, ca. 0.3 mm long. Ovary superior, 3-carpellate, pilose.

Fruit.-- Capsule ovoid, ca. 3 mm long, pilose to base, splitting into 3 firm valves, 1 with the persistent, elongate style; seeds few, usually 2-3, asymmetrically oblong-ellipsoidal or ovoid, ca. 1 mm long, the surface covered with low, papillose, gray-white bumps.

Distribution and Flowering Time

Heath balds on granitic ledges and cliffs, Blue Ridge, western North Carolina (Burke County); flowering mostly in June and July.

Special Identifying Features

This differs from the subspecies "ericoides" (another mat-former on sandy soils, mostly in pinelands but sometimes on rocky mountain summits from Newfoundland south through New England and intermittently south into Delaware with an outlier in Chesterfield County South Carolina) in its broader calyx, the lobe tips of which are narrower, and in its somewhat shorter leaves.

Habitat and Management Implications

H. ericoides ssp. montana occupies small granitic clearings and ledges in the heath balds along the rim of Linville Gorge. It is usually rooted in

the shallow sandy soil of shallow depressions or cracks in the rock, is often at edges of growths of Leiophyllum buxifolium, Hypericum densiflorum, Rhododendron catawbiense, Gaylussacia, Vaccinium, Lyonia, Leucothoe. It is normally at the edge of, or barely under, forest of Pinus strobus, P. rigida, P. virginiana, P. pungens, Tsuga caroliniana, T. canadensis, Quercus prinus, Q. coccinea, Carya ovalis. Frequent sprouts of Castanea dentata are in evidence. Fire was probably the main disturbance factor allowing periodic reduction of competition by both heath species and trees. The forest adjacent to the Hudsonia sites, even in its primal state was, because of the poorness of the soils and the difficulty of topography, probably not of a high potential for timber. Presently, the main threat to survival of these rare plants is the damage done them by trampling feet of rock climbers and hikers.

References

- Bozeman, J.R. and J.F. Logue, 1968. A range extension for Hudsonia ericoides in the southeastern U.S. *Rhodora* 70: 289-291.
- Nuttall, Thomas. 1818. *Genera of North American Plants* II: p. 4.
- Radford, A.E., E. Ahles and C.R. Bell. 1968. *Manual of the vascular flora of the Carolinas*, p. 718. Chapel Hill, N.C.
- Small, J.K. 1933. *Manual of the southeastern flora*, pp. 880-881. Chapel Hill, N.C.

SPECIES Hudsonia ericoides L. ssp. montana (Nutt.) Nickerson & Skog.
golden mountain heather

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			NA	
Damage								
No Lasting Effect								
Beneficial if Done Properly	?				x	x		

Other Comments: effect of grazing not observed, but likely
to be detrimental

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Hudsonia ericoides L. ssp. montana (Nutt.) Nickers. & Skog



CISTACEAE

Lechea maritima Legg. var. virginica Hodgdon. Virginian pinweed

Technical Description

Short-lived shrub, the branches from a short, erect or ascending caudex and a strong, irregularly branched rootstock.

Stem.-- Woody, 1-several, stoutish, stiff, erect or decumbent based or leaning with branches erect and unilateral, the bark dark reddish-brown, longitudinally shallowly cracked, the main axis frequently and diffusely branched to below the middle, usually also producing 1 or more pseudowhorls of basal shoots. Newer shoots and basal shoots with axis pilose-tomentose with whitish hairs.

Leaves.-- Alternate and opposite or whorled (particularly on basal shoots), sessile, usually close-set, those of the basal (overwintering) shoots narrowly elliptic or lanceolate, mostly 5 mm long or less, acute, entire, pilose-ciliate, the upper surface green, nearly smooth, the lower surface pilose-tomentose, thus whitened; leaves of fertile shoots (lower ones absent by flowering time) elliptic-linear, 1 cm or less long, 1 mm wide or less, the tips acute, callused, the margins entire, the bases acute, sessile or short-petiolate, the upper surface yellow-green, smooth, the lower surface strigose-pilose with white hairs.

Inflorescence.-- Flowers numerous, arising singly from the axils of most middle and upper leaves of the abundant shoots, thus producing a leafy-bracted, compound, broadly triangular, panicle.

Flowers.-- Nearly regular, bisexual, obovoid to nearly round or ovoid, 1.5-2.0 mm long; sepals 5 in 2 series, the outer series of 2 linear, the inner 3 scale-like, ovate, cupped around the ovary and fruit, longer than the outer pair, all on the backs pilosulous-tomentose; pedicels stiffly erect or outcurved, tomentose, mostly 1-2 mm long, dilated at summit; petals 3, papery, reddish, shorter than inner sepals, withering and persistent around the fruit; stamens 3-25, about as long as the inner sepals, arising from the receptacle, distinct, the filaments slender, the short anthers nearly round, yellowish; ovary superior, 3-carpellate, smooth, ovoid, the stigmas 3, nearly sessile, fimbriate, reddish.

Fruit.-- An ovoid, 3-valved, smooth capsule ca. 1.5 mm long; seeds 2 (-3)/capsule, ca. 1 mm long, smooth, brown, narrowly ovoid, the backs convex, the inner surface flattish or broadly angled.

Distribution and Flowering Time

Sands of dunes and clearings close to seacoast, southeastern Virginia; flowering from August to frost.

Special Identifying Features

This plant is distinguished from other pinweeds by a combination of the following characters:

1. Outer sepals shorter than inner.
2. Basal leaves (lower overwintering shoot leaves) more than three times

as long as broad; basal shoots present at and past anthesis.

3. Fertile branches from main shoot from well below the middle to apex (often unilateral on spreading main stems!)
4. Capsule hardly as long as inner sepals; seeds usually 2/capsule.

It is distinguished as a variety of L. maritima by its fewer seeds (L. maritima usually has 4/capsule), its tendency to branch from a lower stem level, and by its more shrubby habit (branches remaining alive for more than 1 year!)

Habitat and Management Implications

L. maritima virginica occupies a narrow zone along the coast in eastern Maryland and southeastern Virginia; it was most abundant on sandy clearings and coastal dunes from Fort Henry south to the area of Virginia Beach and Back Bay. It is either on shifting sands of the dunes, or in sandy clearings in oak-pine scrub (the oak often scrub Quercus virginiana), or on sandy rises in brackish marsh. The main danger to the plants is from extensive development of areas along beaches for housing and recreational sites.

References

- Fernald, M.L. 1950. Gray's manual of Botany, ed. 8, pp. 1018-1022. Boston, Mass.
- Hodgdon, A.R. 1938. A taxonomic study of Lechea. Rhodora 40 (470,471), 131 pp., pl.

SPECIES Lechea maritima L. var. virginica Hodgdon. Virginian
pinweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	NA
Damage								
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Lechea maritima Legg. var. virginica Hodgdon



CYPERACEAE

Rhynchospora crinipes Gale. Alabama beaked-rush

Technical Description

Strongly tufted, smoothish, perennial sedge.

Culms.-- Ca. 7.0-7.5 dm tall, slender, subtriangular, erect or spreading, leafy.

Leaves.-- Sheathes closed, narrowly cylindrical, ventrally brownish-scarious; blades spreading or erect, linear, flat, elongate, toward apex narrowed to triangular, scabrid tips, the margin minutely scabrid; blade width to 2 mm.

Inflorescence.-- Clusters of spikelets distant toward culm tips, the erect peduncles exerted from the closed sheathes of subtending bracteal leaves, the clusters 4-5, compact, turbinate, somewhat lobed, the uppermost exceeded by 2 or more setaceous, minutely scabrid, bracts.

Spikelets.-- Lanceolate, ca. 5 mm long, usually with 2 fertile florets and 1 sterile apical; scales lanceolate, aristulate, loosely imbricate, scarious, reddish-brown; perianth bristles 6, rigidly erect, antrorsely barbellate, reaching tubercle tip; akene body pyriform, 1.4 mm long, ca. 1 mm broad, lustrously smooth, biconvex, the somewhat flattened edges and center of akene face pale, the surface otherwise brownish, the akene base narrowed to a terete stipe ca. 0.6 mm long, this covered by white villous hairs; tubercle of akene compressed-triangular, to 0.8 mm long, grayish, its edges scabrid-hispid.

Distribution

Known only from two localities near Mobile, Mobile County, Alabama, where collected by Dr. C. Mohr in June of 1968. Has not been observed since.

Special Identifying Features

Examination of the type material at the U.S. National Museum shows, as Shirley Gale (1944) indicates, a resemblance to R. filifolia Gray, of the same complex in the genus but this last lacks the prominent long, villous stipe to its akene. Extreme specimens of R. curtissii Britt. ex Small and R. harperi Small may have some development of stipe and stipe hairs; however none of the above tend to have leaves as broad, stipes of akenes as long and as hairy. The difficulty remains now with the distinctness of the material identified as R. crinipes but with the sparse available evidence for it in that no material has been found outside the type collection.

Habitat and Management Implications

R. crinipes was collected from "dry places, roadsides (exsiccated), Mobile," and "ditches, borders of ponds, Mobile". One may infer from this, and from visiting the Mobile area, that the original habitat was pineland (slash and longleaf) savanna, probably sandy-peat soil of high hydroperiod. All

species of this complex of beakrush are found to be a part of grass-sedge bog communities whose abundance and perpetuation depend upon periodic burning to reduce forest and shrub competition together with a continuance of high levels of soil water.

References

Gale, Shirley. 1944. Rhynchospora, section Eurhynchospora in Canada, the United States and the West Indies. Contribs. Gray Herb. CLI, pp. 89-278.

SPECIES Rhynchospora crinipes Gale. Alabama beaked-rush

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		x		x			x	
Damage								x
No Lasting Effect								
Beneficial if Done Properly	x				x	x		

Other Comments: Drainage of habitat would destroy this species!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Rhynchospora crinipes Gale



DIAPENSIACEAE

Shortia galacifolia T. & G. Ocone bells
Sherwoodia galacifolia (T. & G.) House
Shortia galacifolia var. brevistyla P.A. Davies

Technical Description

Smooth, evergreen perennial herb or subshrub forming mats by shallow, short or elongate, stoloniferous and creeping rhizomes.

Leaves.-- Alternate, close-set and developing in rosettes from nodes at various intervals along the creeping or arching rhizomes, forming from solitary or clustered imbricate-scaley buds, these scales not persisting through the season, lance-ovate, usually 1 cm or less long, acuminate, entire, subtending either axillary buds of 1-3 (-4) flowers or sterile shoot leaves; leaves of floriferous shoot buds consisting of scales only; leaves of sterile shoots numerous, the lowest above the scales much reduced in petiole, the short blades broadly elliptic to suborbicular, marginally denticulate, the denticles gland-tipped, the larger leaves several, mostly 10-20 cm long, 2/3-3/4 petiole, the petioles green, linear, narrowly winged, the blades broadly ovate, obovate, broadly oblong or (mostly) suborbicular, mostly 4-8 cm long, apically rounded, subtruncate, or broadly retuse, the margin crenate-sinuate, crenate-dentate or dentate, each 'tooth' tipped by a short-excurrent vein tip, the base cordate or rounded; upper blade surface a deep glossy green, the lower surface pale green; venation pinnate, reticulate.

Flowers.-- Regular, bisexual, mostly 1-3 (-4) from a bud, solitary at erect, spreading or slightly nodding tips of slender, erect or ascending, pinkish or reddish peduncles 5-20 cm long, these bearing at or toward their apices 3-4 lanceolate, acuminate, entire and narrowly scarious-white margined, red to pink or pale green, scaly bracts 5-10 mm long, the uppermost ones directly subtending the flower; sepals 5, distinct, imbricate, greenish, lanceolate, oblong or ovate-lanceolate, mostly 5-8 mm long, acute, emarginate or rounded, the margin entire, the surface green or tinged with red, the edge narrowly white-scarious; petals 5, fused at base, the corolla 1-2 cm long, campanulate, the lobes obovate, the rounded apex jagged or erose, the surface white or faintly pink; stamens 5, epipetalous, alternating with petals, departing about midway up the corolla tube, the linear-flattened, yellowish-white filaments ca. 5 mm long, crooked apically, the yellowish-white anthers basifixed, ovoid, pointed inward to touch the style, ca. 0.5 mm long, the anther sacs slightly divergent; staminodes 5, opposite petals at base of corolla, the filaments flattened, short, ca. 0.5 mm long, the blades ovate, flat, yellowish-white, ca. 3 mm long, acute, villosulous-edged; ovary superior, broadly ovoid, 3-carpellate, the style single, erect, linear, elongate (mostly 1.0-1.5 cm long), the stigma capitate, obscurely 3-lobed.

Fruit.-- A greenish, ovoid, 3-locular, loculicidal capsule 5-6 mm long, invested by the persistent calyx and ripening in summer; seeds numerous on axile placentae.

Distribution and Flowering Time

Cool, acidic ravines of the Blue Ridge Escarpment, mostly in the drainages of the Horsepasture, Toxaway and Keowee Rivers of South Carolina and North Carolina; also northeastern Georgia; flowering from late February through March into early April.

Special Identifying Features

There are no other New World species of Shortia, though the genus is found in Asia. Nearest to it in the family in the southeast is the common Galax, G. aphylla, which occupies similar habitat or drier sites, and which produces its much smaller, whitish flowers numerous in elongate, spike-like racemes; in Galax the staminodia are longer than the stamens.

Habitat and Management Implications

This plant, while very local in distribution, is usually quite abundant in the few localities left to it after the wholesale damming up of streams within its area. A typical site would be a deep stream cut through granitic rock where the overstory is comprised of a mixture of cove hardwoods, hemlock, and white pine, the understory made up mainly of heaths such as Leucothoe, Rhododendron (mostly maximum, minus), Kalmia, various Vaccinium, Galyussacia. The soil is usually a strongly humus-enriched moist sand, very acidic. In such sites Shortia may cover the steep slopes along the streams, sometimes to the exclusion of other ground cover, often forming clones several meters across and even extending along old windfallen trunks or over stumps of trees. It appears to be most abundant where shade is heavy, where soil does not dry out and the atmosphere where it grows best is both cool and humid, being kept that way by the insulating effect of the forest and steep ravine slopes. The species has been extirpated over most of its former range by wholesale damming up of streams and rivers, most of its best habitat now under the waters of either Lake Jocasee or Lake Toxaway, only the upper reaches of the streams of these areas now supporting Shortia. Other populations have been endangered through land development or excessive logging of the steep ravines such plants frequent. In that the species depends on a stable, humus-enriched, cool, shaded habitat it should be obvious that logging within its area be kept to a minimum, this being done on a basis of single tree selection if at all.

References

- Davies, P.A. 1952. Geographical variations in Shortia galacifolia. Rhodora 54: 121-124.
- _____. 1955. Distribution and abundance of Shortia galacifolia. Rhodora 57: 189-201.
- _____. 1956. Type location of Shortia galacifolia. Castanea 21: 107-113.
- _____. 1959. Remarks on the Virginia location of Shortia galacifolia. Rhodora 61: 297-301.
- Duncan, W.H., H. Venard, and G.W. McDowell. 1950. Shortia galacifolia from Georgia, Rhodora 52: 229-232.

Gray, A. 1841. Notes of a botanical excursion to the mountains of North Carolina. Am. Journ. Sci. 42: 1-149.

House, H.D. 1908. The genus Shortia. Torreyia 7: 233-235.

Radford, A.E., H.E. Ahles, and C.R. Bell. 1968. Manual of the vascular flora of the Carolinas, p. 818. Chapel Hill, N.C.

Redfield, J.H. 1879. Notes on a botanical excursion into North Carolina. Bull. Torrey Bot. Club 6: 331-339.

Rhoades, M.H. 1966. Seed germination of Shortia galacifolia T. & G. under controlled conditions. Rhodora 68: 147-154.

Small, J.K. 1933. Manual of the southeastern flora, pp. 1018-1020. Chapel Hill, N.C.

Vivian, V.E. 1967. Shortia galacifolia, its life history and microclimate requirements. Bull. Torr. Bot. Club 94: 369-387.

SPECIES Shortia galacifolia T. & G. Oconee bells

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA		X	NA	
Damage	X				X			
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Shortia galacifolia T. & G.



ERICACEAE

Kalmia cuneata Michx. white-wicky laural
Chamaedaphne cuneata O. Ktze.

Technical Description

Soboliferous deciduous shrub.

Shoots.--Solitary or few from the crown, the primary shoots slender, erect or leaning on other shrubs, sparingly branched save above, the older wood terete, with bark gray or gray-brown, thin with shallow, irregular, longitudinal cracks, the branching ascending, the new shoots slender, reddish-brown, the internodes somewhat ridged, puberulent, the short hairs mixed with longer, spreading, gland-tipped hairs.

Leaves.--Alternate, erect or ascending, overlapping in spirals, the blades mostly oblanceolate, 3-6 cm long, apically acute to obtuse-angled, sometimes mucronulate, the margin entire, somewhat revolute, the base cuneate then attenuate to make a narrow wing on the short petiole; upper surface smooth, pale yellow-green; lower surface stipitate-glandular.

Inflorescence.--Flowers in contracted, umbel-like racemes from axillary, ovoid, imbricate-scaley buds toward tips of previous season's growth, expanding shortly after the new shoot leaves.

Flowers.--Complete, rotate on slender, spreading, pale green, glandular pedicels 1.5-3.0 cm long; sepals 5, joined at very base, ovate, calyx 7-8 mm broad, somewhat spreading in bloom, firm, acute, entire, green with pale margins, the backs sparsely stalked-glandular; petals 5, joined into a saucer-shaped, shallowly 5-lobed structure, 1.5-2.0 cm broad, the limb of which is 10-pouched opposite the 10 stamens (which in bud are outwardly bent with anthers fitting into the pouches), white with a narrow red band just outside the stamen ring, the inner surface puberulent inside toward the base, the outer surface sparingly stipitate-glandular; stamens 10, 5-6 mm long, the filaments spreading at anthesis, white, linear, somewhat flattened, the bases broadened where attached to a disc, there sparsely hairy, the anthers oblong, pale brown, ca. 0.5 mm long, introrse-poricidal; ovary superior, depressed-globose, glandular-hairy, slightly 5-lobed, the style simple, straight-linear, ca. 7-8 mm long.

Fruit.--Capsule depressed-globose, 4-5 mm long, the dehiscence septicidal; seeds numerous, pale brown, oblong-cuneiform, 0.6-0.7 mm long.

Distribution and Flowering Times

Moist to wet sandy peats or peats of shrub bogs, savannas and sandhills swales, inner Coastal Plain, North Carolina and South Carolina. Flowering from late May into June.

Special Identifying Features

K. cuneata is most similar to, often in mixed populations with, K. angustifolia var. caroliniana (Small) Fern., but differs in being deciduous, rather than evergreen, in its consistently alternate, cuneate-based leaves (rather than

whorled, elliptic or elliptic-lanceolate), and in its flowers which are white with a red-bordered "eye" (rather than pinkish).

Habitat and Management Implications

K. cuneata is a shrub of high hydroperiod, highly organic soils. It locally abounds in the shrub bogs or pocosins so common in the pinelands and sandhills of the inner Coastal Plain of the Carolinas. Associated with it in the shrub layer are such general as Myrica, Ilex (glabra, coriacea), Lyonia, Gaylussacia, etc. The overstory, often sparse, is comprised of Pinus serotina, P. taeda, sometimes Chamaecyparis, Magnolia virginiana, Gordonia, (often shrubby), Acer rubrum, Nyssa sylvatica biflora, Liquidambar, etc. It is a part of a fire disclimax, and increases as a result of burns. It does not compete well with other shrub bog species, ultimately being over-topped and suppressed by them. Logging of the overstory, by admitting more light, would increase this species so long as the logging was not accompanied by drainage or radical soil disturbance. Any of the conventional mechanical means of site preparation would eliminate the species. Its main enemies up till now have been management schemes which involve mechanical clearing of the shrub layer, this usually accompanied by digging of drainage ditches, disking and plowing. Even if it survives the mechanical site preparation it is subsequently shaded out by the rows of pine as their crowns close. Some populations in the sandhills have been damaged or destroyed by ponds formed by dams built on the streams it grows along.

References

- Ebinger, J.E. 1974. A systematic study of the genus Kalmia. Rhodora 76: 315-398.
- Michaux, A. 1803. Flora Boreali Americana, p. 257. Paris.
- Radford, A.E., H.E. Ahles and C.R. Bell. 1968. Manual of the vascular flora of the Carolinas, pp. 802-804. Chapel Hill, N.C.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 999-1000. Chapel Hill, N.C.

SPECIES Kalmia cuneata Michx. white-wicky laurel

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		x		x			x	
Damage			x					see note
No Lasting Effect								
Beneficial if Done Properly	x				x	x		

Other Comments: Site drainage destroys this species! Foliage
is toxic to livestock.

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Kalmia cuneata Michx.



EUPHORBIACEAE

Croton elliotii Chapm. Elliott's croton

Technical Description

Taprooted, stellate-pubescent, annual herb.

Stems.-- Main stem erect, (1-) 2-6 (-10) dm high, mostly simple, branching only in the inflorescence or sometimes (when luxurious on sites good for it) bushy-branched from near the base, terete, greenish or yellowish-green, the color determined by the trichomes which range from white to blondish or brown; branches upwardly arching, several main ones usually arising at inflorescence base and giving a "whorled" appearance, these usually elongate and toward tips again rebranching in pseudo-whorls, the branches toward their tips increasingly tomentose.

Leaves.-- Basal usually absent by flowering time, usually those toward base of primary branches largest, there "pseudowhorled" on elongated portions of stem and branches rather distant, spreading or ascending, the blades mostly narrowly lanceolate, linear-elliptic, or narrowly oblong, (2-) 3-6 (-8) cm long, firm, acute, entire, the bases rounded to broadly cuneate, only the midrib prominent, the upper surface yellow-green, stellate-puberulent, the lower surface paler, silvered or blondish with stellate tomentum; petioles slender, terete, ca. 1/3-1/2 as long as the blades, stellate-pubescent.

Inflorescence.-- Flowers in nearly sessile to short-pedunculate, compact, erect, indeterminate, spikelike racemes, the female fewer and basal, the more numerous males abscising as the inflorescence elongates, each floret subtended by a tomentose, narrowly linear bractlet slightly longer than the pedicel.

Flowers.-- Regular or nearly so; male globose, ca. 2 mm broad, on stiffish, spreading-ascending pedicels ca. 1 mm long, the sepals (usually) 5, distinct, ovate, strongly arched inward and cupped, 1.5-2.0 mm long, blunt, the backs stellate-pubescent, the petals narrower, distinct, mostly oblong, scarious (very thin), flatter, ascending, alternating with small fleshy glands, the stamens mostly 10-12, erect or incurved, the short (ca. 0.5 mm), slightly divergent anther sacs basifixed, on pale, villous-based filaments ca. 1.5 mm long; female flowers at anthesis nearly 2 x as long as the male, slightly irregular, the 6-8 sepals joined at base into a shallow cup, mostly obovate or oblong-spatulate, fleshy, backs tomentose, apex fleshy, dilated, cup-like, strongly incurved, the ovary sessile, obovoid-globose, densely pale-tomentose, the short style spreading-branching into short-linear segments, these again forking, then reforking to form a total of 12 linear stigma lobes.

Fruit.-- Ripe capsule obovoid-globose, greenish, stellate-hairy, ca. 5 mm long, clasped by the slightly enlarged sepals, 3-loculed, 3-valved, 3-seeded, the seeds ca. 4 mm long, in outline broadly ellipsoidal, the backs rounded, smoothish (minutely cancellate), dark gray, lustrous, the inner faces flattish, forming a broad angle, bearing at very base below the attachment scar a yellowish, fleshy, transverse, ellipsoidal caruncle.

Distribution and Flowering Time

Moist to rather dry sands or sandy peats of fields, flatwoods, roadsides and

pondshroes in the Coastal Plain, eastern South Carolina, (according to Small, 1933), southwestern Georgia, and southern Alabama; flowering from July into September.

Special Identifying Features

Of the entire-leaved species occurring within the range of C. elliotii, and possibly in its habitat, there are but three, namely C. capitatus, C. engelmannii, and C. monanthogynus. The first is a larger plant throughout, with broader leaves, flatter female sepals, and a darker pubescence. The second, in addition to having flatter sepals, has shorter petioles and broader leaves. The third has smaller leaves, broader leaf outlines, is branched near the ground, has smaller male flowers which nod on the pedicels, and a different fruit and seed.

Habitat and Management Implications

C. elliotii frequents moist to dryish sands, sandy peats and peats. It is commonest on the drying shores of permanent to temporary ponds, lakes, and pools in karst topography. It is intolerant of shade. Considered rare and endangered, this species has not shown up much (if at all) in collections since the early 1940's. However, during the 1977 season it has been found to be abundant around nearly every limesink pond in southwestern Georgia, adjacent northwestern Florida, and in southeastern Alabama. Where found it forms nearly pure stands, and is also often locally abundant in those crop fields and pine plantations adjacent to the ponds, and is not infrequent along roadside ditches in these same areas. Thus it would seem that the rarity of this species is only during those long periods in which the complex of requirements for germination of its abundant seed are not met. 1977 was a drought year, exposing large areas in which normally would be underwater or wet, and it is evident that the seed of C. elliotii lie dormant during wet periods. Hardly any other story explains the sudden occurrence of these large stands of the Croton. Mechanical disturbance of the soils in which its seeds lie dormant also appears to promote its increase, the most luxuriant plants being found in places where spoil banks have been created or where pond edges have been plowed.

References

- Chapman, A.W. 1860. Flora of the southern states, p. 430. Cambridge.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 780-783. Chapel Hill, N.C.

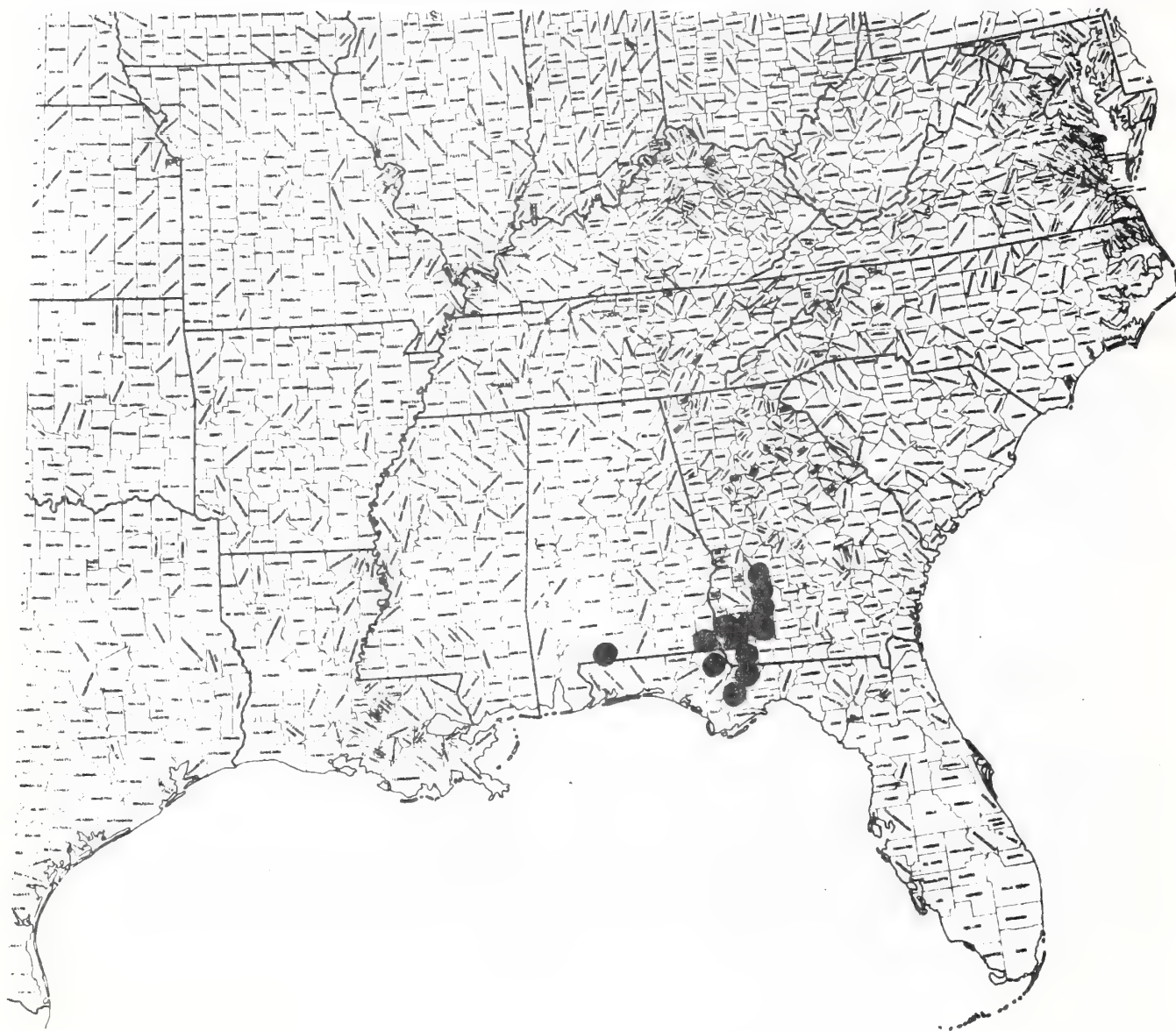
SPECIES Croton elliotii Chapm. Elliott's croton

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy							X	NA
Damage								
No Lasting Effect	X	*	*	*				
Beneficial if Done Properly								

Other Comments: *dependent on time of year!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Croton elliottii Chapm.



HYMENOPHYLLACEAE

Hymenophyllum tunbridgense (L.) Smith. tunbridge fern
Trichomanes tunbridgense L.

Technical Description

Perennial, delicate, smooth, low fern, creeping by filiform, terete, smooth rhizomes, forming dense mats.

Fronds.-- Erect, produced at frequent intervals along the elongate rhizomes, actually drooping from the usually vertical substrate, no longer than 5 cm; stipe (petiole) mostly 1-2 cm long, smooth, terete, dark brown, minutely longitudinally striate; blade simple to 2-pinnate, 1 cell layer thick save for brown mid-nerve, in outline lance-ovate or oblong, 1-2 cm wide, the pinnae mostly 4-6 per side, slightly ascending, in outline cuneate to ob-ovate, asymmetrical, deeply divided into linear or oblong ultimate segments these ascending and somewhat spreading fanlike on the upper side of each pinna, marginally spinulose-serrulate, apically rounded or blunt; mid-vein of blade winged to about the width of the ultimate segments the veins simple, forking only into ultimate segments of their tips; sori enclosed in a cuplike, bi-lobed, obovoid, apically denticulate involucre (modified ultimate segment) ca. 1.0-1.2 mm long at tip of a lower vein of the lowermost pinnule of a pinna, the sporangia in a single cluster, concealed within, borne on a bristle.

Distribution

Moist ledges, caves, ravines in full shade, in North America found only in one ravine in Pickens County, South Carolina; essentially tropical in the New World, in the Old World and Asia extending north to Norway and Japan.

Special Identifying Features

H. tunbridgense in the southeastern area is most similar to Trichomanes, of the same fern family. Trichomanes may be distinguished by its funnel form or tubular involucre, their tips not toothed, the bristly bearing the sporangia projecting beyond the tip of the involucre (rather than concealed within).

Habitat and Management Implications

This fern grows only in one humid ravine, this a steep-sided streamcut through metamorphosed granite. It is in deep shade of mixed hardwoods, hemlock and white pine, with an understory of Rhododendron maximum and Kalmia. It forms mats of pendant fronds on shaded ledges and surfaces of the rock along the ravine base which slopes, sometimes sheerly, into a swift, cold, rock-bedded stream. The atmosphere is often charged with mist from the stream, probably is saturated most of the time, thus the habitat is highly humid, the substrate almost constantly moist, always shaded. It is obvious that continuance of this rare fern depends on maintenance of the streambank and the stream and absolutely no admittance of light such as would occur with any sort of logging.

References

Radford, A.E. Ahles, H.E. and C.R. Bell, 1968. Manual of the vascular flora of the Carolinas, pp. 14-15. Chapel Hill, N.C.

Copeland, E.B. 1947. Genera filicum. Chronica Botanica Co., Waltham, N.Y.

SPECIES Hymenophyllum tunbridgense (L.) Smith. Tunbridge fern

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	NA	NA	NA	X	X	NA	?
Damage								
No Lasting Effect								
Beneficial if Done Properly								

Other Comments: logging of any sort would be detrimental!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Hymenophyllum tunbridgense (L.) Smith



ISOETACEAE

Isoetes louisianensis Thieret. Louisiana quillwort.

Technical Description

Grasslike, mostly submersed-aquatic herb from a 2-lobed corm.

Leaves.-- Numerous, arising in tight spirals around the apex of the contracted corm, erect or ascending, 1.5-4.0 dm long (length depending on water depth, the longer-leaved specimens from deeper water), the abruptly dilated bases serving as sporangia, with outer leaves producing megaspores, inner ones producing microspores; blades above sporangia narrowly linear, deep yellow-green, tapering gradually to the apex, proximally flattened at inner face, and thin-margined, toward the apex with backs more convex, or triangular in cross-section, spongy and longitudinally chambered; stomata present; ligule triangular to ovate, 2-3 mm long; peripheral strands 0-28. Sporangia.-- Oblong-elliptic, the thin wall pale, with dots or short lines of red-brown, particularly on the inner face, 6.5-8.0 mm long, 3.0-4.0 mm broad, the inner face covered from 1/3-1/2 by the velum (a membranous outgrowth of the sporangium apex and sides). Spores.-- Megaspores nearly round, white, irregularly and sharply ridged-reticulate, 0.500-0.625 mm in diameter; microspores brownish, densely and finely spinose, 0.25-0.35 mm in diameter.

Distribution and Phenology

Banks and shallows of clear streams, Washington Parish, Louisiana. Produces spores in May and June.

Special Identifying Features

This extremely rare quillwort is most similar to I. engelmannii var. caroliniana (according to Dr. Thieret, describer of the species) in vegetative character and in nature of megaspores. It differs from that plant by the brown-spotted sporangial walls,

Habitat and Management Implications

I. louisianensis has so far been found only in and along one stream in the Florida parishes of Louisiana. This stream is clear, relatively shallow and swift, and flows through a pine (P. taeda)-bottomland hardwood (mostly Quercus of the willow oak complex) type. There it may be found with its corms shallowly buried in silty sandy substrate, either on banks or bars, or in the stream itself. Thus the plants appear to thrive either submersed or emergent, but obviously require a wet substrate. Logging operations of the sort that would disturb the stream bed or banks would have a disastrous effect on this Isoetes.

References

- Thieret, J.W. 1973. Isoetes louisianensis (Isoetaceae), a new species from Louisiana. Sida 5 (2): 129.
- Reed, C.F. 1965. Isoetes in southeastern United States. Phytologia 12: 369-400.

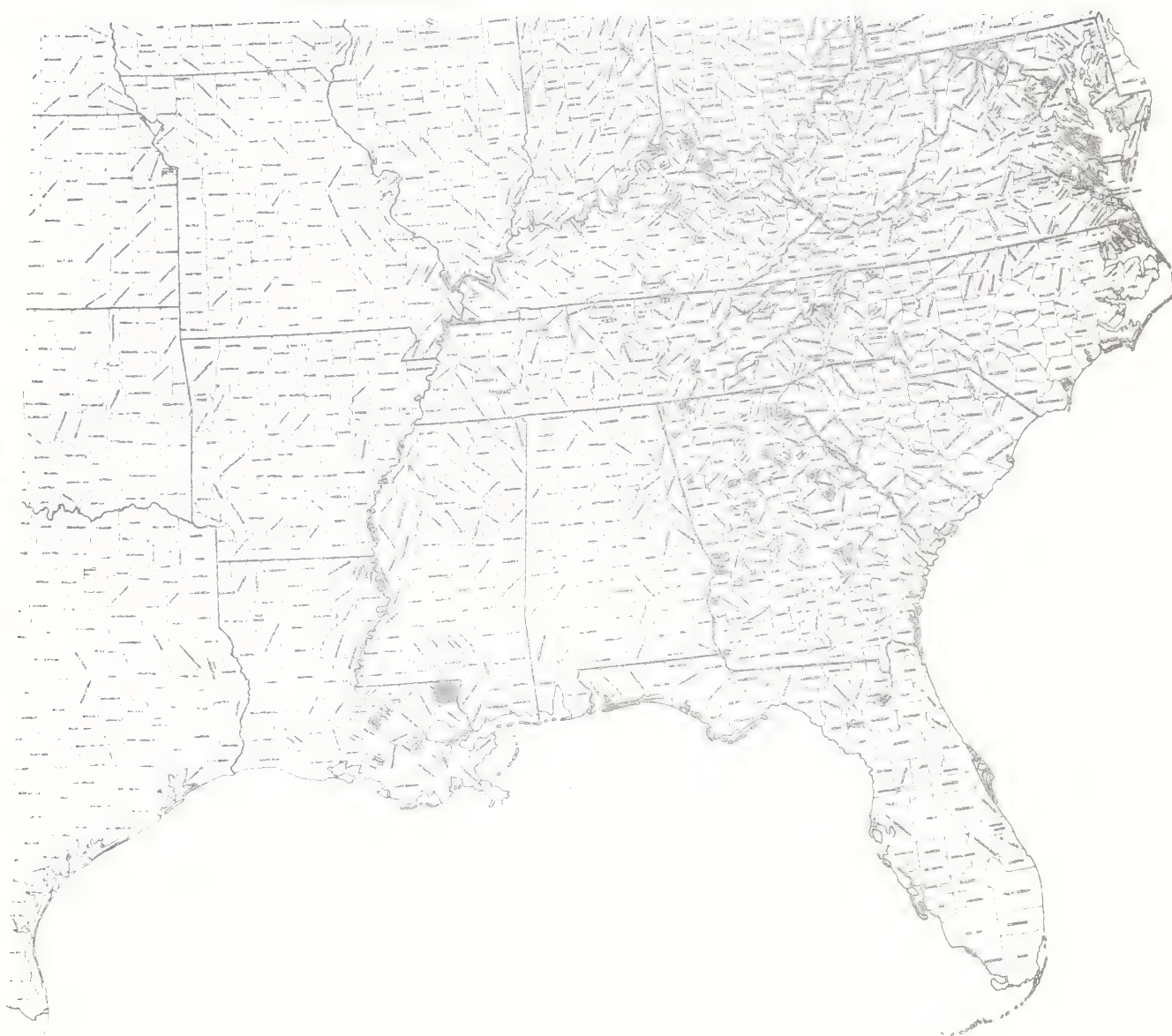
SPECIES Isoetes louisianensis Thieret

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	NA	NA	NA			NA	X
Damage						X		
No Lasting Effect					X			
Beneficial if Done Properly								

Other Comments: grazing stock would trample banks and disturb stream bottom!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Isoetes louisianensis Thieret



LAMIACEAE

Pycnanthemum curvipes (Greene) Grant & Epling. Tennessee mountain-mint
Koellia curvipes Greene
K. multiflora Small

Technical Description

Stiffish, aromatic perennial herbs from coarse rhizomes or a knotty rootstock, also producing slender pale stoloniferous rhizomes from rootstocks and stem bases.

Stems.-- Erect, solitary or few, to 1.5 meters tall, quadrangular save at very base, the lower stem with reddish-brown, thin bark, usually smooth but sometimes canescent-puberulent, toward the middle and above densely canescent-puberulent with whitish, incurved hairs, rarely mixed with a few longer, spreading hairs.

Leaves.-- Opposite, the lowermost usually absent by flowering time, the largest at mid-stem or lower, the blades mostly ovate to ovate-lanceolate, mostly 3-6 cm long, acute, the margins subentire to low-serrate, the base mostly broadly rounded, less often broadly cuneate, the upper surface pale yellow-green, gland-dotted, smooth or nearly so (becoming hairier in the inflorescence), the lower surface whitened with pale, incurved trichomes, the petioles 5-15, mostly 8 mm long, spreading, densely pale puberulent.

Inflorescence.-- Flowers grouped into small cymes, these intermingled with small, linear, canescent bracts, the cymules grouped into dense, hemispherical cymes, these usually terminal and solitary but sometimes in vigorous growth produced also from the next node beneath; all leaves of inflorescence branches similar in shape to main stem leaves but smaller, with upper surfaces whitened.

Flowers.-- Zygomorphic, complete. Calyx 3.0-3.0 mm long, short-cylindric, externally densely white-puberulent, the 5 teeth nearly equal, triangular, the lower 2 longest (comprising the lower calyx lip), ca. 1 mm long, the upper divided nearly to base, all tooth tips short-acuminate or mucronate, often slightly recurved; corolla bilabiate, externally puberulent, the tube ca. 2.503.5 mm long, the upper lip erect, 1.5-3.5 mm long; corolla surface pale lavender, the lips spotted with deep purple.

Fruit.-- Nutlets usually 4, oblong, brown, 1.2-1.4 mm long, the rounded tips hairy.

Distribution and Flowering Season

Dryish, upland woods and clearings or outcrops, in the Southern Appalachians from western North Carolina southward into the Piedmont of Georgia, west of the mountains from middle Tennessee southward through eastern Alabama to the upper Coastal Plain. Flowering from July through August.

Special Identifying Features

This "species" is hardly distinguishable from P. albescens, a plant of similar

sites whose distribution centers in the Gulf Coastal Plain from eastern Texas eastward into northern Florida and inland into Oklahoma and Arkansas. Only the most minor characteristics, such as leaves tending to be rounded at base (instead of cuneate), pubescence of upper stem tending to be consistently incurled-puberulent (rather than often having longer, spreading hairs admixed), calyx teeth broader, shorter, abruptly acuminate with tips tending to recurve, the upper divided nearly to base (rather than narrower and longer, less abruptly acuminate, usually acute, with tips erect, the upper more fused). Actually, inspection of a fairly large series of specimens of P. albescens, there are specimens which have a mix of characteristics of P. curvipes, P. albescens, and the closely related P. incanum. The limits of species in this complex are not yet defined clearly.

Habitat and Management Implications

The habitat of P. curvipes is variable. It may be found at edges of upland woods or in open oak-hickory or oak-pine woods on sandy loams, sandy clay loams, or clay loams. Also it may be found on shallow soil pockets on outcrops of shale, phyllite, or granite (the type locality is Stone Mountain, Georgia). The site is in any event sunny and dry. Plants of this complex of Pycnanthemum exhibit weedy characteristics, rather rapidly occupying abandoned clearings, succeeding in areas where there is fire and/or logging disturbance. Succession to closed-canopy forest, or closure of crowns of plantation pine, would eliminate the species by shading it out.

References

- Grant, E. and C. Epling. 1943. A study of Pycnanthemum (Labiatae) Univ. of Calif. Publ. Bot. 20 (3). 195-240.
- Greene, E.L. 1911. P. curvipes in Leaf. Bot. Obs. and Crit. 2: 140.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1171-1175. Chapel Hill, N.C.

SPECIES Pycnanthemum curvipes (Greene) Grant & Epling.

Tennessee mountain-mint

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy							X	
Damage								
No Lasting Effect		X	X	X				
Beneficial if Done Properly	X				X	X		

Other Comments: effects of grazing not observed

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Pycnanthemum curvipes (Greene) Grant & Epling



LILIACEAE

Schoenolirion wrightii Sherman. Texas sunnybell
S. texanum (Scheele) Gray

Technical Description

Perennial, grass-like, smooth herb, the bulbous base capping a vertical, thick-rooted rhizome.

Leaves.-- All basal and sheathing-based, the outermost strictly scale-like, forming a thin, brownish jacket, the longer ones 2-5 dm long, the blades lineal, mostly 3-5 mm wide, tapering to a narrow but bluntish, angulate apex, with several raised nerves, greenish, the margins minutely papillose; blades toward base gradually widening, straw-colored or near white, their borders thin and broad, clasping.

Inflorescence.-- Scapes erect, mostly 3-6 dm tall, smooth, terete, simple or branching at middle or above, the branches ascending to erect, each subtended by a short-lineal, green, erect bract, and terminating in an elongate, multiflowered, narrow, indeterminate raceme, the slender pedicels upward-arching, in flower mostly 1-2 cm long, each subtended by an ascending, lineal green bract from 1 to 2 cm long (the shortest toward raceme tips).

Flowers.-- Regular, bisexual, nearly 1 cm broad; sepals and petals each 3, distinct, spreading at anthesis, nearly equal (thus perianth tepaloid), elliptic or oblong, ca. 4.0-4.5 mm long, the tips rounded, bluntish, concave, somewhat fleshy, the margins entire, the surfaces medially with 3-4 longitudinal green lines and with broad, greenish-white borders; stamens 6, the erect filaments ca. 3 mm long, lineal but dilating and flattening toward base, the anthers oblong, but with anther pairs slightly divergent, versatile, ca. 2 mm long, yellowish; ovary superior, subglobose, green, the 3 styles united into a lineal, erect slender column ca. 2.5 mm long.

Fruit.-- Capsules trilobed, 4-5 mm broad; seeds globose, 2-3 mm broad, glossy black.

Distribution and Flowering Time

Grassy savannas, swales, northeastern and north-central Alabama, southern Arkansas, eastern Texas. Flowering from late April to early June.

Special Identifying Features

S. wrightii has whitish flowers which, together with its leaves being usually shorter than the inflorescence, distinguish it from S. croceum, a wide-ranging yellow-flowered species whose range it is nested within. The only other white-flowered species is S. albiflorum; this plant of the lower Coastal Plain lacks a rhizome and also has a much more branched inflorescence.

Habitat and Management Implications

S. wrightii is found always on high-hydroperiod, sandy soils, these usually highly organic. It is almost always in full sun, associated with grasses and sedges. Generally it is a part of savanna, the trees being either pines or a mixture of various species of southern yellow pine with hardwoods,

particularly oak and hickory. Such savannas have been maintained over time by fire. The "bog" soils it grows in are eliminated by drainage and the various mechanical site preparation techniques are likewise destructive. Planting with pine likewise is destructive in that ultimate closure of crowns would shade out the herbaceous cover.

References

Correll, D.S. and M.C. Johnston. 1970. Manual of the vascular plants of Texas. Renner.

Sherman, H.L. 1969. A systematic study of the genus Schoenolirion (Liliaceae). Unpublished Ph.D. Thesis, Vanderbilt University.

Small, J.K. 1933. Manual of the southeastern flora: 293-294.

SPECIES Schoenolirion wrightii Sherman. Texas sunnybell

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: drainage of site destroys these plants!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Schoenolirion wrightii Sherman



LILIACEAE

Trillium persistens Duncan. persistent trillium

Technical Description

Perennial herbs from stocky, short, erect, horizontal or declinate rhizomes.

Stems.-- Solitary (rarely paired) from the rhizome tip, erect from sheathing, scale-like basal leaves, terete, mostly 1-2 (-3) dm long, toward the base pale, upwardly becoming dark green or maroon, or green suffused with maroon, tapering slightly into the bracts.

Bracts.-- 3 (rarely 4), lanceolate to ovate-lanceolate, rarely elliptical, mostly 3-5 cm long (-8), 1.5-2.5 cm wide (-3.5 cm), spreading or slightly declined, usually somewhat folded concavely along the midrib, the apex narrowly acute, to acuminate, the margin minutely papillate-scabrid, the base cuneate, nearly sessile, the midrib accompanied by 1-2 fainter, arcuate pairs of laterals, the upper surface dark green, the lower surface paler, in living specimens slightly glaucous.

Flowers.-- Solitary on a slender, erect or slightly spreading peduncle 1.2-3.0 cm long; sepals 3, distinct, ascending or slightly spreading, lanceolate to elliptic, linear or oblong, 1.0-2.5 cm long, 0.3-0.8 cm wide, apically acute to rounded, edged with a thin, pale band. the bases slightly fused, acutish, the surfaces greenish; petals 3, ascending, linear to oblong, oblanceolate or spatulate, 1.5-3.0 cm long, 0.3-1.0 cm wide, apically acute, sometimes bluntish, somewhat longitudinally folded so that the upper surface is concave (lingulate), the margin entire but somewhat crispate (as in Trillium grandiflorum), the surfaces yellowish-white when young, aging to pink; stamens 6, ascending, mostly 10-11 mm long, the yellowish anthers linear, 5-6 mm long, dehiscing laterally, on linear, flattish, white filaments about as long as the anthers; ovary broadly obovoid, ca. 3.0-3.5 cm long, the wall grooved along the sutures, abruptly pointed into the (2-3 mm long) style, this parted into 3 linear, slightly spreading styles which are 4-5 mm long. Fruit not observed.

Distribution and Flowering Time

Acidic, moist to rather dry hemlock-pine-hardwood coves and ravines usually around Rhododendron, northeast Georgia (Rabun and Habersham Counties) and northwestern South Carolina (Oconee County); flowering from mid-March to mid-April.

Special Identifying Features

As stated by Duncan (1971), this species bears resemblances both to T. catesbaei, a common acidic woodland pedicellate trillium of the southern Appalachians and Piedmont, as well as to T. pusillum, a low-growing pedicellate trillium more often found in hardwood bottoms of the Coastal Plain. However, T. catesbaei is usually a taller plant, with much larger and broader leaves, larger flowers whose petals are of a broader outline and strongly recurved. On the other hand it differs from the similar sized T. pusillum in its differently shaped bracts (more often broadest toward the base rather than elliptic or oblong), its more ascending (rather than spreading) petals which tend to be broadest

at mid-point and above (rather than toward the base), and by its ovary which is obovoid (rather than ovoid), and strongly grooved and winged along the sutures (rather than obscurely angled).

Habitat and Management Implications

T. persistens is an acidic, humified sands derived from metamorphosed granites. The sites are steep, at least strongly sloping, bouldery, shaded by an over-story of white, shortleaf and Virginia pine, Red oak, Chestnut oak, White oak, Sweet gum, Yellow poplar, Hickory, Magnolia tripetala. Hemlock is locally abundant toward ravine bases. The understory toward ravine heads is mainly Kalmia, Rhododendron minus, with R. maximum lower down and interspersed with Hydrangea arborescens. Low bush blueberries are abundant on the drier, opener sites, common herbaceous associates include Hexastylis, Galax, Epigaea, Viola hastata, V. pallens. The forest has a scattering of merchantable-sized pine (particularly shortleaf), oak, Yellow poplar, Sweet gum, but the steepness of the terrain together with the erodibility of the soils would preclude any but selective logging. Areas where clearing has been done to provide power line rights-of-way, etc., show heavy erosion, together with a dense overgrowth of Rubus, Hydrangea, Sambucus, Lonicera japonica and Pueraria. Where these clearings have been made through trillium populations, no trillium is in evidence.

References

- Duncan, W.H., J.F. Garst and G.A. Neece. 1971. Trillium persistens (Liliaceae), a new pedicellate-flowered species from northeastern Georgia and adjacent South Carolina. Rhodora 73 (794): 244-248.

SPECIES Trillium persistens Duncan, Persistent trillium

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA		X	NA	
Damage	X				X			X
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Trillium persistens Duncan



LILIACEAE

Veratrum woodii Robbins in Wood. Woods' false helleborne

Technical Description

Perennial herb from a thick-rooted, stout, bulbous rootstock.

Stems.-- Erect, single from the bulb, at base to 2 cm thick, usually encased in old, brown fibrous, overlapping leaf bases, the exposed portions terete, pale yellow-green, with a scattered pubescence of weak, fascicled hairs, gradually narrowing upward, there terete or somewhat angled, also slightly ribbed, scattered-pubescent.

Leaves.-- Rosette leaves arising from lateral shoots buds, emerging in winter or early spring, mostly 5-6 dm long, with half the length petiole, the blades mostly elliptical or broadly oblanceolate, mostly 4-8 cm broad, acute, entire, attenuated to the long, clasping-based petiole, strongly parallel-veined, the upper surface toward the base numerous, overlapping, spreading, the lowermost similar to rosette leaves, all spirally arranged, lowest often withering by flowering time, upward on the stem narrowing, mostly linear, shortening and more distant, in the inflorescence short-linear or lanceolate, each subtending an inflorescence branch.

Inflorescence.-- Flowers very numerous in an erect panicle of racemes, the whole structure narrow, up to 1 meter long, each branch ascending, sharply ribbed, puberulent with pale weak hairs and with numerous flowers from near base to tip, each pedicel subtended by a papery, boat-shaped, ovate, scale-like bract ca. 3.0-3.5 mm long, this ciliate and with puberulence along its ribs on the back; pedicels to 5 mm long, crisped-puberulent, ascending.

Flowers.-- Regular, bisexual or some in a plant strictly male; tepals 6, the petals somewhat longer, all spatulate or oblanceolate, the backs crisped pale-puberulent, the surfaces maroon; stamens 6, filaments slender, maroon, erect or ascending, to 5 mm long, the anthers broadly ovoid, short; ovary superior, 3-carpellate, ovoid, 3-4 mm high, 3-lobed, the acute carpel tips distinct, the styles distinct, lineal, spreading or spreading-recurved.

Fruit.-- Capsule lanceolate, erect, fully 1.5 cm long, strongly 3-lobed and angled, dark reddish-green, externally with a scattering of fascicled hairs; seeds several, strongly wing-margined.

Distribution and Flowering Season

Rich sandy mesic woodlands, in the Southeast from the Cumberlands of Kentucky southward through the Cumberlands and Blue Ridge of Tennessee thence intermittently through various provinces of Georgia into southwestern Georgia and northwestern Florida; wooded summits and coves in the Interior Highlands of Missouri and Arkansas; Iowa; Illinois; Indiana.

Special Identifying Features

V. woodii is closest to V. parviflorum Michx. of similar habitats but more confined to the Appalachians from southwestern Virginia southward into northern

Georgia and Alabama. This last tends to have broader leaf blades, smaller flowers (the petals rarely much longer than 5 mm) whose perianth is greenish on pedicels more than two times as long as the subtending bracts. Also the inflorescence branches in V. parviflorum tend to be more spreading, the inflorescence therefore broader, more diffuse. Both of these species, but particularly V. woodii, are sporadic-flowering, so that almost every population has but few flowering shoots, none at all some seasons. Some confusion as to flower color for V. woodii exists, in that while the freshly emerged perianth is maroon, it does often change to green later, particularly in fruiting specimens.

Habitat and Management Implications

V. woodii is invariably in rich mesic woodlands, its bulbs rather deeply set in moist, well-drained, sandy loams. In Kentucky, Tennessee, and in north Georgia the overstory is often hemlock-hardwood, the hardwoods being a mixture of Quercus such as Q. rubra, Q. alba, Liriodendron, Aesculus, Tilia, Fraxinus, Carya (cordiformis), etc. In the highlands of Missouri and Arkansas the overstory is mainly mixed oak-hickory. In southwestern Georgia and northwestern Florida the plants are found under a mixture of Magnolia grandiflora, Fagus grandifolia, Acer, with a scattering of Spruce pine or Loblolly pine. The herbaceous associates are those usually found in rich deciduous woodlands and include species in the genera Hepatica, Ranunculus, Polemonium, Lilium, Sanguinaria, Polygonatum, Smilacina, Erythronium, Tradescantia, Thaspium, Phlox, etc., together with several genera of woodland ferns including Adiantum, Polystichum, Asplenium, Athyrium, Woodsia. The Veratrum is often in populations of hundreds of plants but the populations may be extremely local. The plants appear to be intolerant of full sun, so that areas contiguous to good populations and which doubtless contained Veratrum but were clearcut now lack the species. Veratrum are considered poisonous and it is to be assumed that they are not eaten by livestock.

References

- Fernald, M.L. 1950. Gray's manual of botany, ed. 8 pp. 427-428. Boston, MASS
- Small, J.K. 1933. Manual of the southeastern flora, pp. 276-277. Chapel Hill, N.C.
- Wood, A. 1855. Classbook of botany, ed. 41, p. 557. New York, N.Y.

SPECIES Veratrum woodii Robbins. Wood's false hellebore

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X		X	X (if pine) *	
Damage	X							
No Lasting Effect					X			
Beneficial if Done Properly								

Other Comments: *plants mechanically damaged by trampling; plants considered poisonous!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Veratrum woodii Robbins in Wood



LINACEAE

Linum carteri Small var. smallii Rogers. Carter's large-flowered flax
Cathartolimum carteri (Small) Small, in part
Linum rigidum Pursh var. rigidum sensu Rogers (1963).

Technical Description

Annual smoothish herb from a taproot.

Stems.-- Erect, stiffish but slender, (1-), 2-4 (-6) dm tall, simple or with simple, spreading-ascending branches from base, proximally purplish-brown and terete, papillose in lines, upwardly greenish with internodes narrowly wing-angled below midribs of the numerous leaves, branching only in inflorescence.

Leaves.-- Linear, linear-oblongate, or elliptic-linear, erect or ascending, spiral and overlapping, small and more spreading toward stem base, largest in lower 1/3 of stem, gradually diminishing into the inflorescence, the largest 1.5-2.5 cm long, acute, entire and somewhat involute, sessile, only the mid-nerve evident, this raised beneath, the surface green.

Inflorescence.-- A cyme, obtriangular in outline, the stiff primary branches usually few, sparingly rebranched, strongly wing-angled, the bracteal leaves and bracts lance-subulate, keeled, marginally glandular-ciliate, the pedicels usually inwardly (upwardly) second, to 1 cm long, usually shorter, wing-angled, axillary, imperceptibly "jointed" 1 mm below calyx.

Flowers.-- Regular, bisexual, opening in morning; sepals 5, distinct. lanceolate, greenish or tinted with maroon, distinct, seemingly in 2 series with the outermost set of 3 longer than the inner 2, deciduous from fruit, all subulate-tipped and glandular-ciliate, triple-nerved with the median nerve raised as a keel; petals 5, distinct, falling by mid-day, golden yellow, spreading, obovate-obtriangular, ca. 15-17 mm long, apically shallowly emarginate, the base broadly cuneate, at very base with a nectariferous "pouch" and there also pilosulous; stamens 5, hypogynous, ascending, the slender white filaments ca. 8-10 mm long, the basifixed, oblong, yellow anthers ca. 1.5 mm long; ovary superior, ovoid, pale green, ca. 3.0-3.5 mm long; style 5-8 mm long, erect. branching just below the 5 yellowish-papillose stigmas.

Fruit.-- An ovoid, greenish-tan capsule ca. 5 mm high, the 5 carpels ultimately separating into 10 1-seeded segments.

Distribution and Flowering Season

- Sandy peat over limestone baserock, moist clearings, cleared areas or pineland savanna, southern peninsular Florida; flowering Feb.-Apr.

Special Identifying Features

This and the var. carteri were at first treated by Dr. Rogers (1963), monographer of the genus, as a part of L. rigidum Pursh whose nearest populations are nearly 1000 miles distant in Texas. Later work (1968) involving cytology as well as morphology confirmed the distinctness of the Florida plants, these

being tetraploid with different corolla pigmentation and different fruit character. There is no problem with identification of L. carteri smallii; it and var. carteri are the only southeastern Linum in which the styles are united to nearly the level of the stigma. L. sulcatum (which occurs no nearer than Georgia) has smaller flowers, styles joined only below the middle, and has persistent sepals. The var. smallii is distinguished from the var. carteri by its smooth stems, taller habit, overall larger flowers (var. carteri has puberulent or scabrid stem angles, shorter habit, smaller flowers). While var. smallii is in the southernmost counties it does extend northward as far as southern Charlotte County; on the other hand var. carteri is confined to the oolites of the Miami area of Dade County.

Habitat and Management Implications

L. carteri smallii grows on sands and sandy peats, usually moist, over a Timestone baserock. It is locally abundant on highway shoulders, disturbed areas in the slash pine-saw palmetto type, or where roads and clearings cross cypress. Thus it is on soils which, while moist, are usually not inundated and it would have a preference for disturbance. It is a plant of full sunlight, thus by inference it would increase in areas where trees and brush were removed, decrease where these form a canopy. The pine flatwoods of southern Florida have a history of the Linum. The greatest present threat to this plant is from overdevelopment of much of its former area for the purpose of housing and industrial development.

References

- Rogers, C.M. 1963. Yellow-flowered species of Linum in eastern North America. Brittonia 15 (2): 97-122.
- _____. 1968. A reassessment of Linum rigidum and L. carteri (Linaceae) Florida, Sida 3 (4): 209-210.
- Small, J.K. 1905. Additions to the flora of subtropical Florida. Bull. N.Y. Bot. Gard. 3: 416-440.
- Small, F.K. 1933. Manual of the southeastern flora, pp. 750-752. Chapel Hill, N.C.

SPECIES Linum carteri Small var. smallii Rogers

Carter's large-flowered flax

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy							X	
Damage No Lasting Effect		?	?	?				X
Beneficial if Done Properly	X				X	X		

Other Comments: Site drainage is detrimental!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Linum carteri Small var. smallii Rogers



LOGANIACEAE

Spigelia gentianoides Chapm. gentian pinkroot

Technical Description

Smoothish, delicate perennial from a shallow, jointed, ascending rhizome.

Stems.-- Usually single, erect, slender but stiff, mostly 1-3 dm tall, toward base terete, maroon, ca. 1 mm thick, upwardly becoming green, the internodes sharply ridge below leaf margins, the ridges scabrid.

Leaves.-- Opposite, decussate, sessile-clasping, with minute, fimbriate stipules; lowermost pairs smallest, often scale-like, grading sharply to the largest which are from midstem to inflorescence spreading, the blades mostly elliptical, narrowly ovate or lanceolate, 3-5 cm long, 1-2 cm broad, acute, the margins scabrid, the base acute, the venation pinnate-arcuate, the upper surface deep green, scaberrulous, the lower surface paler, minutely scabrid only along the veins.

Inflorescence.-- A short, few-flowered, erect, terminal, spikelike raceme, the raceme axis angulate, the angles scabrid.

Flower.-- Regular, bisexual; pedicel stout, rarely longer than 1.5 mm, a slight contraction of the calyx; calyx of 5 sepals, these fused only at base, linear-lanceolate, 4-6 mm long, erect, greenish, minutely scabrid, particularly along margins; corolla gamopetalous 2.5-3.0 cm long, of 5 petals, the tube tubular-funnelform, ca. 1 cm long, broadening to a broadly cylindrical throat which narrows slightly distally just below the base of 5, triangular, erect, acute, scabrous edged lobes 5-6 mm long; corolla surface pale pink, the tint somewhat deeper along edges of the lobes; stamens 5, epipetalous, the filaments projecting inward at a level ca. 1 cm above corolla base, fleshy, ca. 2 mm long, the anthers linear-oblong, ca. 3 mm long, yellow, basifixed, erect, connivent around the style apex; ovary superior, carpels 2, style 1, erect, terete, 1.4-1.5 mm long, minutely pilose, the stigmatic tip truncate,

Fruit.-- A strongly bilobed capsule, this exceeded by the erect, persistent sepals; seed not seen.

Distribution and Flowering Time

Sandy loam of upland woods, northwestern Florida; flowering in May and June.

Special Identifying Features

S. gentianoides overlaps the range of but one other species of Spigelia, namely the wide-ranging and commoner S. marilandica, a taller, larger-leaved, lump former with corollas crimson outside, yellow within, and with stamen tips protruding from the corolla throat rather than being included.

Habitat and Management Implications

This species has been observed but twice since the time Chapman described it, and in both cases was found in oak-pine woods. The soil is a moist or

seasonally dry sandy loam, topped by a thin layer of dark, unincorporated humus. The plants are in light to heavy shade of an overstory of pine (usually a mixture of P. taeda, P. palustris) and hardwoods consisting mainly of Quercus nigra, Q. hemisphaerica, Q. falcata, Nyssa sylvatica, with the understory layer and shrub layer comprised mainly of Cornus florida, Vaccinium arboreum, Rhododendron canescens, Gaylussacia frondosa, G. dumosa, Rubus spp., Smilax spp., Rhus toxicodendron, both high and low-bush Vaccinium. Among herbaceous associates are Mitchella repens, Gentiana villosa, Scutellaria elliptica, Polygala polygama, Pedicularis canadensis, Agrimonia, Chasmanthium, Amianthium. However, none of the herbaceous associates are abundant, and the Spigelia plants are seldom around the bases of the shrubs. More often they appear singly or in small groups beneath the oaks and pines, usually with nothing around them but leaf litter in various stages of decay. Clearcut areas adjacent to the Spigelia show no plants. The area shows some history of fire, none of cultivation. It is doubtful that such a species as this would survive clear cutting which would admit too much light, the result being a drying out and reduction of the humus fraction of the soil. Certainly the Spigelia would not survive mechanical site preparation and the overstory species substitution involved with pine monoculture.

References

- Chapman, A.W. 1860. Flora of the Southern United States, pp. 200-201.
Cambridge, MASS.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1045-1046.
Chapel Hill, N.C.

SPECIES Spigelia gentianoides Chapm. gentian pinkroot

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X		X	X	
Damage								X*
No Lasting Effect								
Beneficial if Done Properly					X			

Other Comments: plants are poisonous to stock, may not be taken,
but trampling of habitat would likely be injurious.

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Spigelia gentianoides Chapm.



LOGANIACEAE

Spigelia loganioides (T. & G. ex Engl.) A.DC. Florida pinkroot
Coelostylis loganioides T. & G. ex Engl.

Technical Description

Smooth perennial herb from a slender, short-stoloniferous rhizome.

Stems.-- Erect or decumbent, simple or sparingly branched from near base, 1-4 dm tall, frequently rooting from nodes of decumbent base, slender, ca. 1 mm thick, proximally subterete, purplish, upwardly becoming greenish, somewhat quadrangular or ridged between nodes below bases of leaf margins, these ridges sparsely scabrid just below nodes.

Leaves.-- Opposite, spreading or ascending, producing erect, triangular, scale-like stipules, sessile, the outermost pairs short, scale-like, mostly distant, grading to largest at midstem or above, these narrowly ovate to elliptic or oblanceolate, 2-4 cm long, mostly bluntly acute or short-acuminate, marginally entire and minutely scabrid, the base cuneate or short-attenuate, pinnately veined with few pairs of laterals, these arcuate, the upper surface deep green, smooth or nearly so, the lower surface paler, minutely papillate along the raised veins; blades gradually or not at all reduced in the inflorescence.

Inflorescence.-- Flowers solitary or few (2-3) in erect, nearly sessile spikelike racemes, these alternate from each pair of upper leaves (bracts).

Flowers.-- Regular, bisexual, erect on short, green scabrous pedicels or nearly sessile, the pedicels often with 1-3 lance-linear bracteoles no longer than 1 mm, the uppermost directly under the calyx; sepals 5, fused at very base, erect, narrowly triangular, greenish, 3.0-3.5 mm long, narrowly acute, the margins minutely scabrid; corolla of 5 strongly fused petals, 1.2-1.5 cm long, white, the narrowly funnelform throat ca. 5 mm long, the throat broadly cylindrical, ca. 4-5 mm long, the lobes spreading in late morning, triangular, 3-4 mm long, bluntly acute, slightly involuted; stamens 5, alternating with petals, epipetalous, the linear, terete, white filaments ca. 1 mm long, directed inward from base of corolla throat the erect, basifixed, yellow anthers linear-oblong, ca. 1.0-1.3 mm long; ovary superior, subtended by a prominent disc, ovoid, 2-carpellate, the style greenish, erect, stoutly linear, ca. 2.5 mm long, continuous with a linear, hispidulous, acute stigma 4.0-4.5 mm long.

Fruit.-- A strongly bilobed capsule, the lobes (locules) nearly round, 3.0-3.5 mm high, few-seeded.

Distribution and Flowering Season

Very local in calcareous hammocks and rises in river bottoms, northern peninsular Florida; flowering from May into July.

Special Identifying Features

This species is distinguished from the other 3 southeastern Spigelia as follows:

1. When stems branch, the branches are produced from the plant base.
2. Flowers are produced from axillary racemes.

3. The corolla is white, smaller than either S. marilandica or S. gentianoides; the style is about as long as the linear hispidulous stigma.

Habitat and Management Implications

S. loganioides is on moist, well-drained, sandy silt-loams of calcareous woodlands, usually in deep shade of Cabbage palm, Live oak, Willow oak, Sweet gum, Loblolly pine hammock, or in river bottom forest of the same type where it appears on high water banks or low natural levees, areas that would be inundated rarely, even though contiguous to real swamp forest. Frequent herbaceous associates are Dyschoriste humistrata, Ruellia, Elytraria, Arisaema, Mitchella, Carex, Chasmanthium, Panicum (Dichantheleum such as D. commutatum), etc. The habitat is sensitive, ecotonal; the plants appear not to react well to logging or pasturing disturbance. Several localities where it was once observed have now been destroyed by either clear-cutting for agriculture and forestry, or by conversion to pasture. The genus is known to be poisonous to livestock, but trampling by livestock surely eliminates this species.

References

- Chapman, A.W. 1897. Flora of the southern United States, pp. 200-201. Cambridge, MASS.
- Small, J.K. 1933. Manual of the southeastern flora, 1044-1045. Chapel Hill, N.C.

SPECIES Spigelia loganioides (T. & G. ex Engl.) A.DC.
 Florida pinkroot

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	X	X	X		X	X (if pine)	X
Damage								
No Lasting Effect					X			
Beneficial if Done Properly								

Other Comments: Site drainage is detrimental! Grazing detrimental in that stock trample plants (which are suspected of being poisonous).

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Spigelia loquanioides (T. & G.) A. DC.



PLANTAGINACEAE

Plantago cordata Lam. heart-leaved plantain

Technical Description

Rosulate, glabrous perennial from a thick (2-3 cm) caudex with spongy, thick, shallow, simple or branched roots, these up to 1 dm or more long.

Leaves.-- Numerous at plant base, erect or spreading, (1-) 2-6 dm long, $\frac{1}{5}$ - $\frac{1}{3}$ petiole, the blades, elliptic to (mostly) ovate, the larger ones mostly 1-2 dm long, to 1.5 dm wide, the tips acute to obtuseangled, the margins entire to undulate, sinuate, or coarsely and irregularly saliently dentate, the base cordate to truncate, then attenuated on the upper petiole; petioles strongly ribbed, though spongy, pale green or tinged with maroon, toward base somewhat equitant, the margins thin, broadening to a broadly clasping base; leaf surfaces a dullish green, the prominent nerves mostly 5-7, parallel on the petiole, the laterals spreading arcuately in the blade.

Scapes.-- Erect, or ascending, 1-4 per plant, mostly 2-6 dm long, stiff but spongy, terete, fistulose (hollow), pale green often with tinges or purple toward base, the flowers borne in the upper $\frac{1}{2}$ - $\frac{1}{3}$.

Inflorescence.-- Spikes narrowly linear, erect, many-flowered, the flowers irregularly, somewhat loosely, arranged (interrupted) along the fleshy axis, each clasped by a broadly ovate, green, scarious-margined, rounded bract about as long as the calyx (ca. 3 mm long).

Flowers.-- Sepals 4, distinct, erect, scale-like, oblong or ovate, 2-3 mm long, rounded-tipped, medially green with broad, pale, scarious margins; petals 4, fused, papery, the corolla salverform, the tube ca. 3 mm long, the spreading, broadly ovate-triangular lobes ca. 1 mm long; stamens usually 4, epipetalous, alternating with petals, the slender filaments exserted, the reddish-brown, short-oblong, apiculate, short-spurred anthers basifixed, ca. 1.5 mm long; ovary superior, carpels 2, style simple, linear, exserted.

Fruit.-- Capsule ovoid, smooth, thin-walled, ca. 4 mm long, 2-chambered circumsessile; seeds 2-4/capsule, ellipsoidal, 3.0-3.5 mm long, dark brown.

Distribution and Flowering Time

Swamps, shallows and banks of creeks, various provinces in eastern North America from southern Ontario, Michigan and Wisconsin southward, extremely rare in the southeastern area, being scattered in western and Piedmont Virginia, Kentucky, North Carolina (Piedmont), northwestern Georgia, northern Alabama, southwestwardly to Louisiana; in southeastern area flowering mostly in April.

Special Identifying Features

In the southeastern area, P. cordata is most similar to P. major, P. rugellii, differing from both in its much greater size, stoutness of caudex, fistulose scapes, more scattered-flowered spike. Seeds are shed and spikes dying back by the time the other two species are producing their long-persistent spikes.

Habitat and Management Implications

P. cordata is a species of very wet, usually shaded sites, generally being found in and along shallow streams of ravines or swamp woodlands. It is normally rooted in muck or wet, silty-sandy or gravelly substrates, these often accumulated over slates, shales, sandstones or limestones. The streams in or along which it grows are clean and healthy, the plants appearing not to persist in polluted situations. Steyermark (1963) notes that the foliage is edible, thus pasturing of the wooded banks it frequents must have a negative effect. Clearcutting of the hardwood overstory would likely produce an adverse effect through altering runoff patterns, aggravating flooding and siltation, and otherwise disturbing the substrate.

References

- Godfrey, R.K. 1961. Plantago cordata still grows in Georgia. Castanea 26: 119-120.
- Harper, R.F. 1944. Notes on Plantago with special reference to P. cordata. Castanea 9: 121-130.
- Lamarck, J and J. Poiret. 1791. Tableau encyclopedique et methodique des trois regnes de la nature. Botanique. I: 338. Paris.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1244-1247. Chapel Hill, N.C.
- Steyermark, J.A. 1963. Flora of Missouri, pp. 1380-1386. Ames.

SPECIES Plantago cordata Lam. heart-leaved plantain

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	NA	NA	NA		x	NA	x
Damage								
No Lasting Effect					x			
Beneficial if Done Properly								

Other Comments: mechanical site preparation may effect indirectly if raw substrate exposed by such methods washes down into the small streams, unless a "buffer" zone is left along streams

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Plantago cordata Lam.



POACEAE

Andropogon arctatus Chapm. pine-woods bluestem
Sorghum arctatum Kuntze

Technical Description

Diffuse-rooted, tufted perennial.

Culms.-- Few to several in a tuft, to 1.5 meters tall (mostly lower), slender, wand-like, smooth, branching in the upper half, the branches ascending.

Leaves. The longest basal, up to 1/3 the culm length, the sheathes strongly overlapping, sharply folded, pale green or pale purplish, with scattered long pale hairs or strongly pale pilose along the margins and shaggy pilose toward the open apex, strongly multinerved; ligule a low glabrous scale; collar long-pale-hairy; blade flattened, to 4 mm wide, narrowly and rigidly acute or acuminate, the margin scabrid, the midnerve strongly raised beneath, the surface mostly smooth, in length progressively reduced upward, grading into spathes.

Inflorescence.-- Spikelets in racemes, these usually paired, straight, linear when expanded, about 4-5 mm wide (exclusive of spreading awns), 3-5 cm long, and on a common, slender peduncle 5-12 cm long, its villous apex projecting well beyond the narrow, inrolled subtending spathe, the tip of which is attenuate, the margins and apex inside long-white ascending-hairy.

Spikelets.-- Sessile (fertile) spikelet ca. 4-5 mm long (exclusive of awn), on a rachis joint that is flattened, ca. 2 mm long, copiously pilose-ciliate from near base to apex; glumes 2, longer than the fertile and sterile floret, lanceolate, firm, the first glume with a strong median groove, thus concave, there smooth, the base pilose, the cartilaginous edges scabrid, the apex bifid, the second glume sharply keeled, the keel scabrid, the surfaces otherwise smooth, the apex acuminate and purplish. Sterile and fertile lemma thin, translucent, shorter than glumes, the narrow apex of the fertile lemma terminating in a yellowish, twisted, hispidulous awn 8-10 mm long. Stalked spikelet vestigial or absent, on an outward-bending, flattened, pilose pedicel 2-3 mm long. Fruit not observed.

Distribution and Flowering Time

Moist, low, grass-sedge clearings in pine flatwoods and savanna, northwest Florida and southeastern Alabama; flowering from late September to frost.

Speical Identifying Features

This species most resembles A. ternarius, a common species throughout the south usually of drier sites, but differs from it in its shorter spikelets, narrower and tawnier racemes (hairs on A. ternarius racemes make these silvery-white by contrast). The first glume of A. arctatus is much more deeply longitudinally grooved.

Habitat and Management Implications

This rare species roots in moist sandy peat of open pine flatwoods and savannas,

there being found in sunny, grass-sedge communities bordering titi, shrub bog, or pitcher plant bog. The dominant trees of the area are Longleaf pine and Pond pine, with other species often being Nyssa biflora, Taxodium ascendens. As is true of other moist pineland savanna species, this one is maintained by fire, lost through drainage. It has not been observed under closed canopies of pines either in natural regenerated stands or plantations. Its reaction to soil disturbance has not been observed, but it doubtlessly invades clearings if ground is not drained.

References

- Chapman, A.W. 1878. An enumeration of some plants chiefly from the semi-tropical regions of Florida. Bot. Gaz. 3: 2-6, 9-13, 17-21.
- Hitchcock, A.S. and A. Chase. 1950. Manual of the grasses of the United States, ed. 2 (revised by A. Chase). U.S.D.A. Misc. Publ. 200.

SPECIES Andropogon arctatus Chapm. pine-woods bluestem

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy							X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: drainage of site is detrimental; mechanical disturbance of site may, if disturbed tracts are not drained, be beneficial

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Andropogon arctatus Chapm.



POACEAE

Calamovilfa curtissii (Vasey) Vasey. Curtis' reed-grass.
Ammophila curtissii Vasey

Technical Description

Perennial, tufted, slender but rather coarse grass, mostly 1.0-1.5 (-1.8) meters tall, with culms arising terminally from spreading or ascending, thick and thick-rooted, knotty rhizomes, these covered by imbricated chaff of old sheath bases.

Culms.-- Erect or ascending, 1-few from a rhizome, stiffish, toward base ca. 5 mm thick, a lustrous yellow-green, brownish in the region of the swollen nodes, the lowermost internodes sometimes excurved.

Leaves.-- Up to 9 dm long; lowermost sheathes strongly overlapping, fully 1 cm broad at the gray-brown base, backs rounded, upwardly becoming stramineous and lustrous; median and upper sheathes more cylindrical, usually as long as or longer than the internodes, stramineous, lustrous; all sheathes apically rounded-auriculate, here entire or sparingly pilose; ligule a low, puberulent and ciliolate ridge; blades dull green to 5 mm wide, very firm, the lowermost sometimes flat, but most usually strongly involute even at base, tapering to very elongate, spreading-recurved, flexuous, filiform, scabrid tips, the margins scabrid.

Inflorescence.-- A narrow, rather dense panicle 3-5 dm long, at first concealed in the uppermost subtending leaf, later well exceeding it, the spikelets numerous on the overlapping, erect or ascending panicle branches on smooth erect peduncles mostly 3-10 mm long, the panicle branches terete, smooth, producing spikelets nearly their whole length or as much as the lower 1/2 naked.

Spikelets.-- In outline lanceolate, pale green with maroon tints, 4-5 mm long; glumes 2, lanceolate, keeled, smooth, acuminate to acute, the single scabrid nerve often excurrent as a short mucro, the first glume 3.0-4.0 mm long, the second ca. 4.0-5.0 mm long; floret solitary on a short rachilla joint, this at its apex pilose with silvery-silky erect hairs; lemma and palea thin, pale green lanceolate, narrowly acute or acuminate, subequal, ca. 5 mm long, the lemma mostly crisped-white-pilose toward its base, the palea similarly pilose at least along the 2 keels. Stamens 3.

Distribution and Flowering Season

Moist sands or sandy peats of slash and longleaf pine-saw palmetto flatwoods and flatwoods savanna, northeastern and eastern peninsular Florida; flowering in summer.

Special Identifying Features

The genus Calamovilfa, and particularly this species, bears particular resemblance to some Calamogrostis and Ammophila. It differs from the former in its glumes not being longer than the lemma, from the latter in its shorter rachilla joint. C. curtissii differs from other southeastern species of its

genus by its combination of very thick rhizome and very narrow panicle, together with the pilosity of the lemma and palea backs.

Habitat and Management Implications

C. curtissii is an inhabitant of pine flatwoods, its thick rhizomes rooted in moist, usually organic sand, this usually with a high hydroperiod. The overstory is usually a scattering of both Slash and Longleaf pine, the understory predominantly Serenoa repens intermixed with ericads such as Lyonia, Befaria. It is a savanna plant, maintained by fire, and its herbaceous associates include several Andropogon, Panicum, Aristida, Polygala, Xyris, Rhexia cubensis, Eriocaulon, Lachnocaulon, Eryngium aromaticum, etc. Cutting of the trees opens up area for this type, as does burning. Drainage destroys it, as does fire on the drained land. Overplanting with pine has a negative effect, such grasses as C. curtissii being shaded out as the crowns close.

References

- Godfrey, R.K. and R. Kral. 1958. Observations on the Florida flora.
Brittonia 10: 166-177.
- Hitchcock, A.S. 1950. Manual of the grasses of the United States, ed. 2
(revised by A. Chase). U.S.D.A. Misc. Publ. 200 pp. 329-332. Washington.
- Scribner, F.L. 1899. American grasses II. U.S.D.A. Div. Agrost. no 17:
7-349.
- Vasey, G.V. 1884. A new grass. Bull. Torr. Bot. Club 11:7.
- _____. 1892. Monograph of the grasses of the U.S. and British America.
Contrib. U.S. Nat. Herb: 1-89.

SPECIES Calamovilfa curtissii (Vasey) Vasey, Curtiss' reedgrass

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X		X			X	?
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: drainage of site is detrimental!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Calamovilfa curtissii (Vasey) Vasey



POACEAE

Glyceria nubigena Anders. Smoky Mountain manna-grass

Technical Description

Tufted, smooth, short-rhizomatous, perennial grass.

Culms.-- Erect or ascending, decumbent-based, to 1.5 meters tall, often rooting from the lower nodes, rather soft, toward base 2-4 mm thick, the nodes brown or reddish-brown, the internodes multiribbed, pale green.

Leaves.-- Sheathes opening distally, multinerved, green-tinted often with red or purple, at mid-culm much shorter than the subtended internode; ligule a thin erect scale to 4 mm long; blades rather soft, green, ascending, linear, 5-10 mm wide, tapering to a narrowly acute tip, the margins scabrid, the larger blades 2-3 dm long becoming shorter, usually less than 1 dm toward the inflorescence, both surfaces scabrid along the many prominent veins.

Inflorescence.-- Spikelets numerous in an open, diffuse, lax panicle, the panicle branches spreading or drooping toward the tips, very slender, scabrid, naked toward base, rebranched at middle or above (very rarely floriferous to nearly base), the ultimate branches bearing scattered, rarely overlapping, stalked spikelets; spikelet stalks 3-10 mm long, capillary, scabrid.

Spikelet.-- At maturity elliptic or oblong, ca. 5 mm long; glumes 2, ovate or broadly lanceolate, acute or narrowly rounded, the first (lowermost) ca. 1.0-1.5 mm long, shorter than the second which is ca. 1.5-2.0 mm long, the backs pale green, that of the second usually with 3 strongly raised nerves, the margins broad, pale scarious; florets mostly 4, the larger lemmas ca. 3 mm long, lance-elliptic, narrowed to white, scarious, somewhat erose tips, the backs with 7 strongly raised, parallel nerves, the nerves stopping short of the apex, the green surface bordered by a narrow purplish band, this internal to a broad, scarious margin; palea about equal in length to lemma, the 2 nerves sublateral, strongly scabrid; grain ellipsoidal, dark reddish-brown, ca. 2 mm long.

Distribution and Flowering Season

Seep swamps and bogs at higher elevations in the Blue Ridge, western North Carolina and eastern Tennessee; flowering in June and July.

Special Identifying Features

G. nubigena, within the complex of Glyceria that have 7-nerved lemmas, and in general aspect, is closest to G. grandis but that more northern species has much more purplish florets and has subequal glumes.

Habitat and Management Implications

G. nubigena is in boggy places, either in full sun or shade, in the higher mountainous areas of the Blue Ridge. Surrounding forest is usually in the fir or spruce-fir type, or is Hemlock-hardwood. It may also be in seep

areas in high elevation grass balds. In either event it is part of a wet-land complex of grass-sedge. Draining the site would eliminate the species; logging in or around the seeps would not only alter the drainage but the substrate as well.

References

- Anderson, W.A. 1933. A new species of Glyceria from the Great Smoky Mountains. *Rhodora* 35: 321.
- Hitchcock, A.S. 1950. Manual of the grasses of the United States, 2nd ed. (revised by A. Chase). U.S.D.A. Misc. Publ. 200: 81-93.
- Radford, A.E., H.E Ahles and C.R. Bell. 1968. Manual of the vascular flora of the Carolinas, pp. 80-82. Chapel Hill, N.C.

SPECIES Glyceria nubigena Anders. Smoky Mountain manna-grass

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	NA	NA	NA		X	NA	X
Damage					X			
No Lasting Effect								
Beneficial if Done Properly								

Other Comments: site drainage is detrimental!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Glyceria nubigena Anders.



POLYGALACEAE

Polygala lewtonii Small. Lewton's milkwort.

Technical Description

Biennial (or short-lived perennial?), smooth, the stems strongly tufted around summit of a stout, deep taproot.

Stems.-- Both sterile and fertile shoots produced, these spreading, ascending or erect, slender but stiffish, usually decumbent-based, angulate, no longer than 2 dm, the primary shoots often rebranched with short, usually erect or ascending branches, the internodes decurrently ridged below the leaves or their scars, thus the internodes narrowly angled, new growth often gland-dotted.

Leaves.-- Simple, usually erect and overlapping in spirals, sessile, yellowish or grayish-green or tinted with maroon, rather succulent, linear, spatulate or oblanceolate, the lowest smallest, those toward midstem largest, mostly 1.0-1.5 cm long, acute, sometimes apiculate, entire, the surface somewhat granular, the venation not evident.

Inflorescence.-- Racemes loosely flowered, oblong-cylindrical, 1-5 cm long, erect, the pedicels spreading or ascending, slender, angulate, gland-dotted, mostly 2.0-2.5 mm long, each subtended by a scarious, whitish, early-deciduous, narrowly triangular bract ca. 1 mm long, the fruit and pedicels dropping soon after maturity; cleistogamous flowers produced on separate shoots at plant base, more scattered in narrower, longer, usually leafless, racemes.

Flowers.-- Two sorts produced, chasmogamous and cleistogamous, the former at tips of elongate, leafy shoots, ca. 5 mm long, irregular, bisexual, the calyx of 5 sepals projecting forward, distinct or nearly so, the 2 lowermost and the 1 uppermost smallest, greenish, scale-like, narrowly ovate, boat-shaped, 2.0-2.5 mm long, the 2 laterals (wings) petaloid, ca. 5 mm long, short-clawed, the blades oblong or lanceolate, bright pink; petals 3, joined at base and also with the fused filaments of the stamens, projecting forward, pinkish, the lowest distally forming a cuplike, fimbriate-tipped keel (the whole structure ca. 3.5 mm long), the ascending stamens enfolded by the cupped sides of its auriculate-lobed base, at base joined to the 2 asymmetrically oblong lateral petal lobes; stamens 8, not evidently diadelphous, the filaments basally joined, the free whitish filament tips upwardly bent, terminating in short yellowish, cylindric-oblique, 2-locular, poricidal anthers; ovary superior, bilocular, with 1 ovule/locule, the style terminal, bent as in Viola, its truncate stigmatose tip forming a cup.

Fruit.-- Capsule short-cylindrical, somewhat angulate, also bilobed, ca. 5 mm long, the seeds cylindric, ca. 3 mm long, strongly carunculate.

Distribution and Flowering Season

Deep sands of clearings in sandscrub and sandy high savanna, lakes region of peninsular Florida; flowering from February and March intermittently through summer.

Special Identifying Features

This species is closest to P. polygama, which is widespread on a variety of soils through the eastern U.S. However, it has a much larger root, tends to form larger clumps, the leaves tend to be narrower, the wing sepals more rhombic (inequilateral rather than obovate, and are shorter than the capsule (rather than equal to it or longer) which is of a narrower outline.

Habitat and Management Implications

P. lewtonii is extremely local in the Florida sandhills in the highlands of the peninsula and is mostly to be found in the Sand pine-evergreen scrub oak type or in high sandy lakeside savannas which are dotted with longleaf pine and low scrub oaks. The sites are usually quite dry, the vegetation sparse. Occasionally the species comes in on powerline clearings or along new roads. It is threatened most by the construction of large housing developments or wholesale clearing for orange groves. Cutting of pine and removal of competing oak scrub would tend to favor this species. Its reaction to fire has not been observed, but it is part of a type in which fire has had an historic role.

References

Small, J.K. 1898. Studies in the botany of the southern United States, p. 140. Bull. Torr. Bot. Club 25: 140.

_____. 1933. Manual of the southeastern flora, pp. 768-773.
Chapel Hill, N.C.

SPECIES Polygala lewtonii Small. Lewton's milkwort

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy							X	
Damage		X	X	X				
No Lasting Effect								
Beneficial if Done Properly	?				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Polygala lewtonii Small



POLYGONACEAE

Eriogonum harperi Goodman. Harper's wild-buckwheat
E. longifolium Nutt. var. harperi (Goodman) Reveal

Technical Description

Biennial from a strong, woody, deep taproot.

Stems.-- Erect, unbranched, often to 2 meters tall, bolting the second season from strong rosettes, brittle, toward base to 2 cm thick, lanate-tomentose with long, sordid hairs, toward and in inflorescence with hairs shorter, more spreading, and admixed with puberulence.

Leaves.-- Rosette leaves with blades mostly oblanceolate, fully 3-4 dm long, to 7 cm broad, spreading or ascending on broadly linear, clasping-based petioles to 2-3 dm long, stem leaves ascending, numerous and overlapping in a spiral, progressively reduced in size and shorter petiolate into the inflorescence, the uppermost sessile, usually lanceolate; leaf apices mostly acute to short-acuminate, the margin entire to slightly crispate-sinuate, the base (of lower leaves) attenuate; upper leaf surface becoming smooth, deep yellow-green; lower surface densely white, silky-tomentose.

Inflorescence.-- An elongate but spreading, profusely branched panicle of cymes, up to 6 dm long, this broadest at its concave summit. Major branches upwardly arching, tomentose, subtended by lanceolate to linear bracteal leaves, the branching cymosely branched again, these secondary branches with nodes bi-bracteolate, producing nearly sessile to stalked flower clusters; each flower cluster a small umbel, the florets on short stalks subtended and concealed by a turbinate, 5-triangular-toothed tomentose involucre ca. 4-5 mm long, the receptacle of this bearing reduced florets and tomentose scales as well pedicels mostly 1.5-3.0 mm long, linear-angulate, villous.

Flowers.-- Symmetrical, either male or bisexual in the same cluster, at anthesis narrowly turbinate, ca. 5 mm long (in fruit nearly doubling in length). Perianth 6-parted, of sepals only, these nearly equal in 2 sets, oblong-linear, pale yellow-green and tomentose with silvery long hairs, spreading at anthesis, erect in bud and fruit, joined at base into an attenuate, pale-tomentose tube which is jointed inconspicuously to the pedicel. Stamens 6, attached along the rim formed by the bases of the perianth lobes, about as long as the perianth lobes, the slender yellow-green filaments long than the short-oblong, 2-celled, reddish, versatile anthers; ovary superior, 1-celled, white-tomentose, styles 3, separate and linear.

Fruit.-- A utricle, the ovary much enlarged in fruit, becoming 5-6 mm long, oblong and strongly 3-angled, the angles produced at the retuse summit into short-triangular teeth; seed lanceolate, ca. 5 mm long, obscurely triangular, smooth, a lustrous, deep, reddish-brown.

Distribution and Flowering Time

Very local on thin soil over limestone of bluffs, ledges and barrens,

northwestern Alabama and east central Tennessee; flowering in July and August.

Special Identifying Features

E. harperi is sympatric with no other species of erigonum, of which there are but 3 other species in the southeastern U.S. Its nearest relatives would be E. floridanum a species of the sandhills in southern Florida, and E. longifolium, of rocky or sandy woods in poor open woods from Louisiana, Missouri and Arkansas west or southwest. E. harperi is a taller plant with much larger leaves, the stem leaves numerous and gradually reduced upward on the stem into the inflorescence. E. floridanum and E. longifolium have fewer, much more distant and reduced, stem leaves, the upper part of the stem thus appearing naked. Neither of these has the same fruit shape, and there are distinct perianth differences.

Habitat and Management Implications

E. harperi grows on thin, heavy soils over limestones or dolomites, these mostly of Mississippian age. In such habitats it is scattered, usually in clearings in forest made up of Juniperus virginiana, Quercus muhlenbergii, Q. shumardii, Carya carolinae-septentrionalis, Cercis, Ulmus rubra, U. americana, U. serotina, etc. Undersotry shrubs are Symphoricarpos, Hypericum frondosum, Viburnum rufidulum, various Prunus. As the overstory increases the erigonum is shaded out. Occasional natural fire would probably tend to increase this species, as it would release through clearing of overstory species. However, logging would have to be selective (such sites, through their difficult terrain almost necessitating this) with every care taken to prevent excessive mechanical disturbance of soil. Effects upon the plants of grazing have not as yet been observed. The steepness or rockiness of the habitat is such that the forage is often unsuitable for any but goats or sheep.

References

- Goodman, G.J. 1947. A new Eriogonum from the southeast. Bull Torrey Bot. Club 74 (4): 329-331.
- Reveal, J.L. 1968. Notes on the Texas Eriogonum. Sida 3: 195-205.

SPECIES Eriogonum harperi Goodman's Harper's wild-buckwheat

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA				
Damage						X		X
No Lasting Effect								
Beneficial if Done Properly	X				X			

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Eriogonum harperi Goodman



PORTULACACEAE

Talinum appalachianum W. Wolf. Appalachian fame-flower.

Technical Description

Succulent, smooth perennial herb from a fleshy, elongate but thickish, terete, simple or apically forking, lustrous, pale brown, taproot-like caudex, this bearing toward its apex a scattered, spiral system of narrowly triangular-linear scale leaves.

Leaves.-- Toward base of stem and on caudex narrowly linear-triangular, scale-like; foliage leaves crowded toward shoot tips, terete, linear ascending, the larger ones 3-4 cm long, 2-3 mm thick, short-subulate-tipped, dull green, the sessile bases slightly clasping, appearing "jointed" to stem.

Inflorescence.-- Mostly 5-10 cm long; peduncles 1 or 2, axillary to shoot leaves toward shoot apex, erect, linear-filiform, terete, straw-colored, branching above the middle to form an open, few-flowered cyme, the branches and pedicels subtended by opposite pairs of narrowly triangular, scarious bracts 3-4 mm long.

Flowers.-- Regular, bisexual, rotate; sepals 2, distinct, broadly ovate, ca. 2 mm long, thin, pale green suffused with pink, reticulately veined; petals 5, distinct, spreading, oblong, ca. 5 mm long, 3 mm broad, rounded-tipped, a lively lavender-rose; stamens 5 (-6-8), usually alternating with petals, distinct, the ascending filaments filiform, deep pink, 2.5-3.0 mm long, the bright yellow anthers oblong, 0.7-0.8 mm long; ovary superior, 1-locular, ovoid, ca. 1.5 mm high, style simple, narrowly linear, erect, pink, 1.0-1.2 mm long at anthesis, the stigma at first appearing button-like but actually with 3, involute-margined, pale, papillose lobes.

Fruit.-- Capsule ovoid, 4 mm long, green, smooth, splitting into 3-4 thin valves,; seeds cochleate (snail-shaped), several from a free central placental columella, dark reddish-brown, lustrous though minutely roughened.

Distribution and Flowering Time

Southwestern tip of Appalachians along Coosa River in Chilton and Coosa Counties, Alabama; flowering from May into July.

Special Identifying Features

This Talinum, according to an Alabama student of the genus, Dr. W. Wolf (1939), is not closely related to other southeastern terete-leaved species, the erect and forking caudex habit being in distinct contrast to the more irregular habit of T. mengesii and T. teretifolium. Also this is the smallest of the Alabama species in size of plant and size of flower. The stamens are consistently less in number also, there being 12 or more in T. teretifolium, 40 or more in T. mengesii. Its flowers open toward dusk, thus later than in the other two arenaceous-outcrop species.

Habitat and Management Implications

T. appalachianum grows on the thin soil that accumulates in the rubble of of schistaceous granite covering outcrops of same, with the erect caudexes hidden by the gravel, only the green leaves and inflorescences protruding. The habitat is quite dry, usually clearings in oak-pine forest, the pines being a mixture of Shortleaf and Loblolly with an occasional Longleaf, the oaks primarily Quercus stellata, Q. coccinea, Q. falcata, Q. nigra, Q. coccinea, Q. velutina. Hickories such as Carya tomentosa, C. pallida, C. glabra are scattered throughout. Understory shrubs in the area are Vaccinium arboreum, V. stamineum, V. elliotii and low bush Vaccinia, Forestiera, Bumelia, Rhus, Smilax, etc. Herbaceous associates include Opuntia, Delphinium carolinianum, Sporobolus, Aristida, Danthonia, Andropogon, Dichanthelium, Panicum, etc. The forest, because of the thin soils is of a generally poor quality and unsuitable for conventional mechanical methods of site preparation. There is history of fire in the area, this probably aiding in slowing down herbaceous and shrub competition on the sunny clearings the Talinum occupies. The only presently known locality is threatened, since a part of it is often used or traversed by heavy highway equipment or powerline maintenance crews.

References

- Small, J.K. 1933. Manual of the southeastern flora, pp. 403-404. Chapel Hill, N.C.
- Wolf, W. 1936. The status of Talinum in Alabama, Amer. Midl. Nat. 22: 315-332.

SPECIES Talinum appalachianum W. Wolf. Appalachian fame-flower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			X	
Damage								
No Lasting Effect								
Beneficial if Done Properly	?				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Talinum appalachianum W. Wolf



RANUNCULACEAE

Aquilegia canadensis L. var. australis (Small) Munz. southern columbine
A. australis Small

Technical Description

Perennial herb from a stout caudex.

Stems.-- Erect, usually solitary, slender, 3-10 dm tall, terete, sparsely pilose or nearly glabrous, pale yellowish-green, branching only in the inflorescence.

Leaves.-- Rosette leaves numerous, mostly 1-3 dm long, 2/3 petiole, these slender, ascending or spreading from abruptly dilated, scarious-margined, clasping bases, terete, pale green or tan, sometimes maroon-tinted, pilose, the blades broadly ovate or triangular, 2-3-ternately compound, the leaflets reniform to suborbicular or obovate, 1.5-3.0 cm long, usually deeply 3-cleft-and-lobed, the lobes 2-3-rounded-lobed at tips, the margins usually entire, the bases cuneate to rounded or truncate, with the lateral leaflets generally inequilateral; upper surfaces dark yellow green, lower surfaces glaucous; stem leaves progressively shorter-petioled and more distant upward on stems, grading into 3-lobed, simple, bracteal leaves.

Inflorescence.-- An open paniculate compound of cymes, the long-peduncled branches ascending from all or most upper (bracteal) leaves: flowers nodding.

Flowers.-- Regular, bisexual; sepals 5, distinct, erect, lanceolate or ovate-lanceolate, 1.2-1.5 cm long, acute, entire, rounded-cordate, reddish with green tips; petals 5, distinct, 3-4 cm long, each for most of its length joined into a narrowly conical-tubular spur, the open end ca. 6-7 mm across, flaring obliquely, yellowish, the tubular part reddish, gradually then abruptly narrowed, then broadening at its tip into a small, nectar-filled bulb, with all spurs directed backward (upward) on the inverted flower; stamens numerous, the pale slender filaments flattened and somewhat dilated proximally, projecting the yellow, basifixed, oblong, 1.5 mm long, anthers well beyond the perianth tips; carpels 5, erect, lance-linear, distinct, weakly pilose, the styles linear, 1.0-1.5 cm long.

Fruit.-- Follicles erect, lance-cylindrical, 1.5-2.0 cm long. glabrescent, the acuminate tips but slightly spreading.

Distribution and Flowering Time

Calcareous bluffs and outcrops, northwestern Florida; flowering in March and April.

Special Identifying Features

This variety is distinguished from the wide-spread north American type variety by a combination of more glaucous foliage, somewhat larger flowers with the sepals narrower and slightly longer, the spurs stouter, and follicle tips less spreading. The type locality is in the calcareous outcrop areas at

Mariana, Florida, a considerable disjunction from the area of A. canadensis var. canadensis. Munz (1946) treats Texas material named A. australis by Small (1898) as part of another variety (latiuscula (Greene) Munz) which is a lower plant with narrower spurs. A problem in identification and rank of these taxa still exists in that specimens of A. canadensis var. canadensis show such a wide range of variation as to include most, if not all, the characters used by Munz (l.c.) for the other varieties.

Habitat and Management Implications

A. canadensis australis grows in the shallow soil mantles of ledges of or in crevices in limestone of Oligocene age in the area of Mariana, Jackson County Florida. Particularly fine examples of it are to be found on shaded limerock outcrops along the Chipola River in Mariana Caverns State Park, these usually in association with such herbaceous genera as Trillium, Sanguinaria, Isopyrum, Lithospermum (tuberosum), Senecio (obovatus), Phlox (divaricata), etc. in tight to dense shade of mixed mesophytic forest characterized by mixed oaks, hichories, ash, maple and elm. Normally it is rooted in a humified sand. The only cutting of overstory that should be recommended for this type would be selective in that clearcutting would admit intolerable amounts of light and heat. Opening such woodlands to grazing would have a negative effect more through trampling of plants and physical damage to the thin soils than from an actual use by livestock.

References

- Munz, P.A. 1946. Aquilegia, the cultivated and wild columbines. Gentes Herbarum VII (1): 1-150. Ithaca, NY.
- Small, J.K. 1898. Studies in the botany of the southeastern United States. Bull. Torr. Bot. Club 25: 466.
- _____. 1933. Manual of the southeastern flora, pp. 514. Chapel Hill, NC.

SPECIES Aquilegia canadensis L. var. australis (Small) Munz.

Southern columbine

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	NA	NA	NA		X	NA	
Damage								X
No Lasting Effect					*			
Beneficial if Done Properly					*			

Other Comments: *selection, group selection

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Aquilegia canadensis L. var. australis (Small) Munz



RANUNCULACEAE

Clematis addisonii Britt. Addison's leather-flower
Viorna addisonii (Britt.) Small

Technical Description

Perennial, semishrubby, glabrous vine from a stoutish short caudex.

Shoots.-- At first erect, by fruiting time often arching or leaning, usually single from the woody rootstock, brittle, terete, purplish and glaucous, either simple or branching from the middle and upper nodes.

Leaves.-- Opposite, the lowermost pairs very short, lineal to obovate, erect, the largest at mid-stem or above, mostly ovate, 8-12 (-15) cm long, 6-10 cm broad, acute to rounded or emarginate, rarely deeply retuse or bilobed, entire, narrowly revolute, the bases rounded, cordate, sometimes obliquely so, sessile or with very short, clasping based petioles, the upper surface deep green, obscurely palmately veined, the lower surface glaucous, noticeably reticulate; bracteal leaves of main axis indistinguishable from main shoot leaves in shape or size, those of later growth, particularly of side branches, much smaller, often divided into 1-2 pairs of leaflets, or these modified to tendrils.

Flowers.-- Regular, bisexual, usually nodding, arising singly or doubly from shoot tips or oppositely from axils of shoot and branch on spreading, bi-bracteate, purplish-glaucous peduncles, the pedicels 3-8 cm long, their tips recurved; sepals 4-5, valvate in the ovoid bud, later forming a campanulate calyx, distinct, thickish and leathery, lanceolate, ca. 2.5 mm long, the tips recurved and short-acuminate, the backs reddish-purple, smooth, parallel-veiny, the inner surface tomentose, densely so along the margin; stamens numerous, erect, ca. 2 cm long, the filaments pilose, linear, the anthers basifixed, linear, yellowish, 4.0-4.5 mm long, the connective and its protruding narrow tip pilose; carpels numerous, at anthesis reaching about to the level of the erect anthers, erect, the carpel body ovoid, 1-ovuled, densely sericeous-tomentose, the styles elongate, densely silky-hairy to stigma tip, the hairs yellowish-white, the stigmas short-linear.

Fruit.-- Ripe akene body laterally flattened, with a few slightly raised veins, in outline broadly ovate, ca. 6 mm long, 4-5 mm broad, short acuminate into the persistent style, brown with pale, appressed soft hairs, the style densely yellowish-plumose-hairy, fully 4 cm long, usually strongly spreading or recurved.

Distribution and Flowering Time

Rocky wooded bluffs and ravines or ledges, Valley and Ridge, southwestern Virginia; flowering from May into early July.

Special Identifying Features

This leather flower is the least viney of its complex, usually the shoots erect and fairly short by first flowering time, only later leaning, and often

producing no tendrils; typically the leaves are simple, mostly sessile, only those of lateral branches sometimes compound.

Habitat and Management Implications

C. addisonii is scattered on thin soils over limestone or dolomite, either on open outcrops or under light to moderate shade of mixed hardwood-Juniperus, the substrate moist to rather dry. The overstory when present is comprised of a mixture of Quercus, primarily Q. muhlenbergii, Q. rubra, Q. alba, hickories such as Carya ovalis, C. glabra, C. cordiformis, Juglans, Acer saccharum, Ulmus, Celtis, Fraxinus americana, etc. Juniperus virginiana is interspersed. The steep topography and highly erodable nature of the thin soils would suggest that logging of the overstory should be confined to single tree selection, if any is recommended at all on these difficult and sensitive areas.

References

- Erikson, R. 1943. Taxonomy of Clematis Sect. Viorna. Ann. Mo. Bot. Gard. 30: 1-60.
- Fernald, M.L. 1950. Gray's manual of botany, ed. 8, pp. 663-666. Boston, MA
- Keener, Carl S. 1967. A biosystematic study of Clematis subsection Integrifoliae (Ranunculaceae). Journ. Elisha Mitchell Sci. Soc. 83(1): 1-41.
- _____. 1975. Studies in the Ranunculaceae of the southeastern United States III. Clematis. Sida 6 (1): 33-47.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 526-528, Chapel Hill, NC
- Wherry, E.T. 1937. Clematis addisonii Britton, Claytonia 3: 42-43.

SPECIES Clematis addisonii Britt. Addison's leather-flower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			X	
Damage	X					X		
No Lasting Effect								
Beneficial if Done Properly					X			

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Clematis addisonii Britt.



RANUNCULACEAE

Clematis viticaulis Steele. grape leather-flower

Technical Description

Perennial herb from an erect or ascending, subligneous rhizome.

Stems.-- Erect, mostly 3-5 dm tall, terete or very slightly angled, brownish, the surface proximally brown, retrorsely strigose, upwardly crisped-pale-puberulent (sometimes ageing smooth) and reddish-brown, branching oppositely or in whorls from all or most nodes.

Leaves.-- Opposite (rarely whorled), all simple, the lowermost scale-like, usually gone by flowering time the largest at about mid-stem, ovate or lance-ovate, mostly 5-8 cm long, acute, usually mucronulate, the margin entire, or rarely with a pair (-3 prs.) of low teeth, the base rounded or broadly cuneate, nearly sessile on short (2-5 mm) crisped-puberulent petioles, leathery, the upper surface yellow-green, smooth, somewhat reticulate, the lower surface paler, arcuately and pinnately veined, strongly reticulate, aging smooth save for puberulent vein bases and axils.

Flowers.-- Regular, bisexual, 1.5-2.0 cm long, erect on erect or upwardly curved, pale-puberulent peduncles 4-6 cm long (these much elongating in fruit); calyx campanulate, the 4 sepals valvate in bud, on expansion lanceolate or oblong-lanceolate, thickish, the acute tips slightly recurved, externally greenish with tints of blue and maroon, strongly parallel-nerved, pale-pilosulous, the thick edges pale-tomentulose; petals absent; stamens numerous, 1.3-1.5 cm long, the flattish filaments distinct, erect, linear, 7-8 mm long, distally pilose, the anthers scarcely broader, the broad connectives appressed-pilose with pale hairs, particularly toward the tip; carpels numerous, distinct, about the length of the sepals at anthesis, erect, the lance-linear, pale-tomentose ovary tapering into slender, appressed pilose style, this with a linear-recurved stigma tip.

Fruit.-- Akenes at maturity aggregated into a loose head at summit of fruiting stalks to 5 cm long; akene body broadly ovate, flattened, ca. 5 mm long, silky with appressed whitish hairs, the persistent slender styles 2-3 cm long densely plumose-hairy from base to stigma base, the hairs reddish-brown.

Distribution and Flowering Time

Shale barrens, Bath and Rockbridge Counties, western Virginia; flowering in June.

Special Identifying Features

C. viticaulis is in the complex of Clematis consisting of erect plants which are non-viney and whose leaves are always simple, usually sessile or short-petiolate. It is nearest C. albicoma Wherry, another shale barren plant, but differs in its puberulent (rather than villose) sepal backs and its reddish-brown plumose styles (rather than whitish-pubescent).

Habitat and Management Implications

Keener (1971), recent monographer of this complex of Clematis, has stated that C. viticaulis is a strict shale barren endemic and is confined to shales of Upper Devonian age. It is usually on a southern exposure, on steep slopes, particularly toward slope bases, usually where these are undercut by stream action. The vegetation is sparse, much of it on weathered rock flakes in a matrix of thin, yellow-brown soil which has an acid reaction. Such genera as Sedum, Hedyotis, Viola, Senecio, Phlox, Eriogonum, Allium, Trifolium, Paronychia, Oenothera, Scutellaria, Melica, Aster, Antennaria, etc., these often also endemic representatives, are associated. The overstory is either absent or rather thin, comprised of low grade specimens of Pinus virginiana, P. rigida, P. pungens, Juniperus virginiana, various dry site Quercus such as Q. ilicifolia, Q. velutina, Q. coccinea, Q. stellata, Q. alba, etc., Nyssa sylvatica, several Carya species and such shrubs as Vaccinium, Ilex, Kalmia, Rhododendron, Oxydendrum, etc. Fire and mechanical erosion (slippage of the fracturing, thin-bedded shales) have doubtless been the historical factors providing open space for the Clematis. Conventional methods of mechanical site preparation are not applicable on this sort of topography. Increase of forest, particularly pine, on such sites would, through shading, eliminate this species.

References

- Erickson, R.O. 1943. Taxonomy of Clematis, sect. Viorna. Ann. Mo. Bot. Gard. 30: 1-60.
- Fernald, M.L. 1950. Gray's manual of botany, 8th ed., pp. 663-666, New York.
- Keener, C.S. 1967. A biosystematic study of Clematis subsection Integrifoliae (Ranunculaceae). --Journ. Elisha Mitchell Soc. 83 (1): 1-41.
- _____. 1971. The natural history of the mid-Appalachian shale barren flora. In P.C. Holt (ed.) the distributional history of the biota of the southern Appalachians, part II. Flora. Research Div. Monogr. 2. Virginia Polytechnic Institute and State University, Blacksburg.
- Steele, E.S. 1911. New or noteworthy plants from the eastern U.S. Contr. Nat. Herb. 13: 359-374.
- Wherry, E.T. 1935. Fifteen notable shale barren plants. Claytonia 2: 19-21.

SPECIES Clematis viticaulis Steele. Grape leather-flower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	NA	NA	NA			NA	
Damage								X
No Lasting Effect								
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Clematis viticaulis Steele



RANUNCULACEAE

Thalictrum cooleyi Ahles Cooley's meadow-rue

Technical Description

Perennial, smooth herb from a slender, erect caudex.

Stems.-- Erect or leaning on other plants, slender, greenish, to 1 meter tall or slightly more, teretish but with a few low, minutely scabrid ridges.

Leaves.-- Both basal and cauline, the lowermost cauline leaves and basal leaves petiolate, ternately compound, the ultimate leaflets lanceolate to lance-linear or ovate (highly variable in shape and length), mostly 1-2(-5) cm long, 0.3-1.0 cm broad, the laterals nearly sessile or on slender petiolules to 5 mm long, the terminal one often longer-stalked, leaflet apices rounded to acute, the margins entire or (in larger leaflets) often 1-3 lobed or with a strong pair of lateral teeth, the venation of larger leaflets ternate or subpalmate, the bases rounded or acute; larger petioles 0.4-1.0 dm long, ascending, slender but with broadly scarious-auriculate clasping bases; stem leaves progressively smaller, shorter-petioled, more distant upward on stems, in the inflorescence sessile or nearly so.

Inflorescence.-- Flowers few, in an open panicle on slender pedicels to 2 cm long.

Flowers.-- Regular, unisexual (the species is dioecious); sepals mostly obovate, 4-5, distinct, early deciduous, the staminate ones yellowish to white, ca. 2 mm long, broadly rounded or bluntly acute, apiculate, slightly longer than the greenish pistillate ones; petals absent; stamens with slightly clavate, lavender filaments ca. 5-7 mm long, the yellowish anthers ca. 2 mm long, apiculate; carpels several, fusiform, distinct, short-stipitate, many-ribbed, smooth save for the minutely hairy, linear stigmas.

Fruit.-- Akenes narrowly ellipsoidal, ca. 5-6 mm long, 1.5-2.5 mm wide, many-ribbed, the stigmas persisting, straight but bent somewhat inward at base.

Distribution and Flowering Season

Moist to wet savanna-bogs, Coastal Plain, eastern North Carolina; (North-west Florida; Georgia (a possible hybrid according to Dr. Rayner!))

Special Identifying Features

According to Ahles (1939), describer of the species, T. cooleyi differs from all others of its section (Leucocoma) in its lavender (instead of white) filaments, its much narrower leaflets (narrowly lanceolate instead of oblong to ovate) and its fewer leaf divisions.

Habitat and Management Implications

T. cooleyi is in high hydroperiod soils of pineland savanna or pocosin clearings where it is scattered in grass-sedge, where associated with such

genera as Dichromena, Zigadenus, Calopogon, Dionea, Habenaria, Sarracenia, Parnassia, Eryngium, Oxypolis, Rhexia, Asclepias (lanceolata, rubra) Cacalia, Eriocaulon, etc. The clearings are in a shrub type made up of Myrica, Ilex (glabra, coriacea), Vaccinium, Lyonia, Andromeda, Zenobia, Rhododendron, etc. and usually the scattered overstory is comprised of P. palustris, P. taeda, Taxodium ascendens, Liriodendron, Acer rubrum, Nyssa biflora, etc. Visits to previously known localities in 1976 and again in 1977 revealed no plants, but Stephen Leonard and Douglas Rayner have since (1980) relocated populations. All these areas were either in plantation pine (Slash) or in various states of site preparation involving drainage, plowing, discing or bulldozing plus raking. The ecological history of this species is probably similar to that of other wet savanna species, clearings being largely maintained through removal of competing woody vegetation by fire. It is obvious that this very rare plant has become even more rare through the extensive drainage, site preparation and planting to pine done within its small known range.

References

- Ahles, H.E. 1959. Thalictrum cooleyi, sp. nov. *Brittonia* 11: 68-70.
- Radford, A.E., H.E. Ahles and C.R. Bell. 1968. Manual of the vascular flora of the Carolinas. Chapel Hill, N.C.

SPECIES Thalictrum cooleyi Ahles. Cooley's meadow-rue

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Thalictrum cooleyi H. Ahles



ROSACEAE

Geum radiatum Michx. Spreading avens
Sieversia radiata (Michx.) Greene

Technical Description

Perennial, the older plants forming large, dome-like tufts from lateral, ascending rhizomes that are thick, brown-chaffy and fibrous.

Stems.-- Usually arising singly from rhizome tips and from strong rosettes, to 5 dm tall, hirsute or hispid-hirsute.

Leaves.-- Basal rosette leaves by far the largest, on luxuriant specimens fully 3 dm long, the petiole usually 3-4 times as long as the blade, terete, pale green, hispid-hirsute with yellowish hairs, its base abruptly dilated, clasping, with broad, thin margins, the blade either simple or lyrate-pinnate, the terminal segment much the largest, suborbicular to reniform, (5-) 10-15 (-20) cm broad, irregularly and many-toothed, often narrowly and deeply incised, the lateral pairs of leaflets (when present) of few to several pairs, mostly 1.5 cm long or less, distant, spreading, variously toothed and incised, usually inequilateral, cuneate-based; the upper surface deep yellow green, scattered-strigose, the lower surface paler, strigose-hirsute, particularly along the several palmate, major veins, the petiolar surface coarsely hirsute; stem leaves abruptly smaller, ascending, mostly ovate, obovate or rhombic, lacerately serrate, often also deeply incised-lobed.

Inflorescence.-- A few-flowered, rather narrow cyme or a raceme, the slender, erect, villous and hirsute pedicels at anthesis longer than the flower.

Flower.-- Showy, regular, bisexual; hypanthium at anthesis saucer-shaped, ca. 6-8 cm broad, green, villosulous and strigose-hirsute; calyx lobes 5, spreading, triangular, acuminate, 6-8 mm long, green, the tips thickened and blunt, alternating with 5, short-linear, blunt-tipped sinus appendages, all strigose-hirsute externally, lanulose above toward the tips; petals 5, obcordate, spreading, mostly 1.0-1.5 mm long, a deep, clear yellow grading to orange at the cuneate base and often bearing medially below the petal "notch" a short, ridgelike appendage within; stamens numerous around hypanthial rim, spreading and erect, 4-5 mm long, the filaments pale yellow, ca. 4 mm long; carpels numerous, erect, distinct, the narrowly fusiform-ellipsoidal ovaries silvery-silky-tomentose, ca. 4 mm long, tapering into narrow, erect, pale green, smooth styles fully as long or longer.

Fruit.-- Akenes erect, the body lanceolate in outline, somewhat compressed, silvery pilose, ca. 5 mm long, tapering into a persistent erect smooth style fully 1 cm or more long.

Distribution and Flowering Time

Clearings in mountain heath balds at summit elevations, southern Appalachians, western North Carolina and eastern Tennessee; flowering from June into August.

Special Identifying Features

There is no other Geum in the southeastern area that remotely resembles this species, it being nearest taxonomically to G. peckii of the White Mountains

of New Hampshire and north into Nova Scotia. There are no other southern species in this section (Sieversia) which is distinguished in part by its persistent, straight or but slightly bent, non-jointed styles. G. radiatum is the most ornamental of southeastern area geums, its flowers by far the largest.

Habitat and Management Implications

G. radiatum is usually found rooted in dark, highly humified moist sandy loams in crevices in granitic rocks or in grass balds or grassy clearings in heath balds at summits of the higher mountains in the Appalachians along the North Carolina-Tennessee border, thus usually at elevations of 5000 feet or more. The forest at these elevations is normally Picea rubens-Abies fraseri, but the Geum is never under these trees. It is definitely a plant of full sun and loses ground to increasing clones of Rhododendron catawbiense, Alnus, other shrubs, or forest reproduction. The Rhododendron is usually the prime culprit in crowding or shading it out. It is locally abundant in a few localities, most of which are public land. Much of its endangerment apart from its being shaded out by competing shrubby vegetation, comes from irresponsible construction of park or forest facilities such as parking lots, trails or public buildings within its area.

References

- Chapman, A.W. 1897. Flora of the southern states, ed. 3, p. 135. Cambridge, Mass.
- Michaux, A. 1803. Flora Boreali-Americana, p. 300. Paris.
- Radford, A.E., H.A. Ahles and C.R. Bell, 1968. Manual of the vascular flora of the Carolinas, pp. 542-545. Chapel Hill, N.C.
- Small, J.K. 1933. Manual of the southeastern flora, p. 618. Chapel Hill, N.C.

SPECIES Geum radiatum Michx. Spreading avens

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	NA	NA	NA			X	
Damage								
No Lasting Effect								
Beneficial if Done Properly					*	*		

Other Comments: *Removal of shrub and reproduction competition would benefit this plant.

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Geum radiatum Michx.



ROSACEAE

Prunus geniculata Harper. scrub plum

Technical Description:

Non-soboliferous, scraggy, heavily but irregularly branched, broad crowned shrub to 2 meters tall, the bark of older stems thin, gray (usually lichen-encrusted), cracking into irregularly rectangular or squarish plates.

Twigs.-- Twigs of young or normal growth strongly zig-zag, the lateral branches either forming short, stubby spur shoots or strongly tapering, spine-like; bark of new shoots lustrous reddish-brown or purplish, often at first puberulent, becoming smooth toward end of season; bark of older growth a lustrous gray, cracking longitudinally into a braided pattern revealing a reddish inner bark; terminal bud absent, laterals ovoid-triangular, ca. 2 mm long, the scales reddish-brown with smooth backs and ciliate margins.

Leaves.-- Alternate, smooth, appearing crowded on spur shoots, rather distant, spreading or ascending on normal shoot growth; stipules linear-subulate, ca. 5 mm long, pectinately fringed with reddish glands, green, smooth; leaf blades ovate to obovate or elliptic, mostly 1-3 cm long, short-acuminate, regularly serrulate with teeth tipped by reddish glands, the base rounded or broadly cuneate, on a reddish, slender petiole $1/3$ - $1/2$ as long as the blade.

Flowers.-- Regular, bisexual, developing singly from buds lateral to axillary buds, appearing before leaves, rather crowded on spur shoots, more distant on spine bases or along vigorous shoots, spreading on short, smooth green pedicels slightly if at all exerted beyond subtending bud scales (thus appearing sessile); hypanthium funnelform, green-tinted with maroon or red, ca. 3 mm long, smooth; calyx lobes 5, spreading-ascending, triangular, acute, sparsely ciliate, reddish or green, the backs smooth, the upper surface white-tomentulose; petals 5, spreading, ca. 5 mm long (flower at anthesis ca. 1.0-1.3 cm broad), white, the ovate to obovate blades with rounded tips, their bases attenuated to short, ciliate-margined claws; stamens numerous, more or less erect on hypanthial rim, ca. 5 mm long, the slender, terete, linear filaments white, smooth, tapering to nearly round, versatile, yellow anthers 0.5 mm long; ovary superior, lance-ovoid, ca. 3 mm long, smooth, tapering apically to a linear, smooth style 5-6 mm long, this terminating in a buttonlike stigma.

Fruit.-- On stalks to 3 mm long; drupe ovoid or ellipsoidal, 1.2-2.5 cm long, dull reddish, the stone but slightly flattened, but with a groove ventrally, the flesh tin and bitter.

Special Identifying Features

Prunus geniculata differs from all other plums of Florida in the sessile appearance of its small, fragrant flowers. As its discoverer Dr. Harper (1911) has stated, its affinities appear to be with the common and widespread, soboliferous Chickasaw Plum, but this shrub does not appear to form thickets, and its fruit in character is more like that of P. umbellata, the Sloe.

Also, the mature leaf blades are not folded peachlike as they are in P. angustifolia. In short, this little species is very distinct from the other Florida plums.

Habitat and Management Implications

P. geniculata occurs on deep "yellow" sands of longleaf pine-turkey oak sandhills as well as on "white" sands of sandscrub dominated by evergreen scrub oak, various ericads, and sand pine. As in true of many other woody species frequenting sandhills in the longleaf pine type, it responds vigorously to fire disturbance and historically was probably fire maintained. The primary threat to the species now is through the development of much of its habitat into housing and orange groves.

References

- Harper, R.M. 1911. A new plum from the lake region of Florida *Torrey* 11: 67.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 646-650.

SPECIES Prunus geniculata Harper. Scrub plum

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								*
No Lasting Effect								
Beneficial if Done Properly	x (moderate)				X	X		

Other Comments: *Some Prunus are toxic to livestock!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Prunus geniculata Harper



RUBIACEAE

Hedyotis nigricans (Lam.) Fosb. var. pulvinata (Small) Fosb.

Mat-forming narrow-leaved bluets

Houstonia pulvinata Small

Houstonia nigricans (Lam.) ern. var. pulvinata (Small) ern.

Technical Description

Low, compact, much-branched, essentially smooth perennial herb, forming circular mats from a woody, branched rootstock.

Stems.-- Mostly 1.0-1.5 dm high, numerous, low-spreading or arching, prolifically branching from sub-woody older stem bases, pale green, lustrous, angled or quadrangular (longitudinally narrowly grooved below the stipules).

Leaves.-- Opposite, stipulate, the stipule an erect, scarious, triangular erose or lacinate scale ca. 1 mm high; blades spreading or ascending, sessile, linear, linear-oblongate, or elliptic-linear, 0.8-1.2 cm long, mostly 1-2 mm wide, acutish, the margins revolute, the upper surface pale green, the lower surface paler, only the medial vein evident; leaves largest at midstem, gradually reduced up the stem into inflorescence.

Inflorescence.-- A compound system of small, pedunculate cymes arising from most of the upper leaf axils, thus the whole plant at anthesis because of its many branches a cushion of lavender bloom.

Flowers.-- Regular, bisexual, erect on short, stiffish, often maroon-tinted pedicels to 1.2 mm long; calyx at anthesis funnelform, ca. 1.5 mm. high, the 4 lobes lance-ovate, ca. 6-7 mm long, erect, acute, the calyx surface green, smooth or sparsely strigose; corolla about 5 mm long, narrowly somewhat funnel-form, bright lavender, the cylindrical tube ca. 2 mm long, expanding to the short, funnelform throat ca. 1 mm long, the 4 lobes slightly spreading-triangular, 2.0-2.5 mm long; inner corolla surface densely villosulous, outer surface smooth or sparsely strigose on the throat; stamens 4, epipetalous, the anthers oblong, ca. 1 mm long, alternating with the corolla lobes, nearly sessile ca. 1 mm below the corolla sinus; ovary nearly round, part inferior, smooth, ca. 0.5 mm high, 2-carpellate, the style erect, linear, ca. 5 mm long, densely minutely puberulent.

Fruit.-- Calyx tube enlarging in fruit to 2 mm, thus longer than the calyx lobes; capsule ca. 2.5 mm long, projecting slightly beyond calyx tips, obovoid, nearly 3 mm long, somewhat compressed, 2-lobed, and keel-margined; seeds several/locule, ca. 0.5 mm long, irregularly elliptic-oblong, nearly black, muciculate.

Distribution and Flowering Time

Sandy clearings, dunes, coquina reefs along the coast, eastern peninsular Florida; flowering from May intermittently through summer.

Special Identifying Features

This variety is to be distinguished from the other varieties of this widespread, polymorphic species by its consistently lower, mat-forming habit. The dense

hairiness of the inner surface of its corolla sets it off from its nearest variety, var. filifolia, a taller, more erect, more sparse plant with longer, narrower leaves which is from sand dunes and coastal sandy areas from the tip of Florida along the Gulf of Mexico to Texas.

Habitat and Management Implications

"Typical" var. pulvinata is found on and near the east coast of Florida, usually on or around coquina sands or old limestone reefs. If inland it is never far inland and there usually around coquina rock outcrops or sandy clearings near these outcrops. The habitat is dry, may have various Opuntia, Monarda punctata, Gaillardia pulchella, Ipomopsis rubra, Phyllanthus, Cenchrus, Helianthus debilis, etc. Overstory, of forest, surrounding clearings or nearby, is mostly pine, in some places sand pine mingling with various live oak species, in others longleaf pine mixed with slash pine, generally with an understory mostly of ericads and palmetto. The main threat facing the variety at present is from overdevelopment of the coastal areas for retirement and vacation housing and for commerce. Inland where the plants are found in small clearings, the management of pine is usually clearcutting followed by mechanical site preparation and planting to slash pine. This destroys the small clearings in which the Hedyotis grows.

References

Fosberg, F.R. 1954. Notes on plants of the eastern U.S. *Castanea* 19: 25-37.

Small, J.K. 1899. Undescribed species from the southern U.S. *Bull. N.Y. Bot. Gard.* 1: 278-290.

_____, 1933. *Manual of the southeastern flora*, pp. 1253-1256. Chapel Hill.

SPECIES Hedyotis nigricans (Lam.) Fosb. var. pulvinata (Small)
Fosb. Mat-forming narrow-leaved bluet

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	X	X	X			X	
Damage								
No Lasting Effect								
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Hedyotis nigricans (Lam.) Fosb. var. pulvinata (Small) Fosb.



SALICACEAE

Salix floridana Chap. Florida Willow

S. chapmanii Small?

Technical Description

Shrub or tree, in the former with several ascending trunks and a broad bushy crown; in the latter with 1 or few trunks from a single diffuse root, diameters of up to 40 cm, heights to 30 meters (fide R. K. Godfrey); bark grayish, braided in long, flat interlacing ridges, the furrows rather shallow, revealing a reddish-brown inner bark.

Twigs.-- Brittle, rather stiff, the new shoot growth greenish-brown, pilosulous; year-old shoots reddish or purplish-brown, sparsely pubescent with usually appressed hairs or glabrous; winter buds erect, lance-ovoid, greenish or reddish-brown, ca. 4 mm long, glabrous.

Leaves.-- Alternate, spirally arranged, deciduous, stipulate with stipules persisting on some shoots, variable in shape but usually broad, often reniform, bilobed, glandular-denticulate; leaf blades rather variable in shape and size, mostly (5.5-) 8-15 cm long, 2.5-5.0 cm broad, broadly lanceolate, ovate, elliptical, oblong or even obovate, rather firm, flat, bright yellow-green and smooth above, very glaucous beneath with the surfaces or at least the midrib and veins villosulous, apically acute, often mucronulate, the margin irregularly serrulate or serrulate-denticulate, each denticle with its tip producing a yellowish or reddish gland, the base rounded; largest leaves usually toward shoot apex, smallest but often broader outlined ones toward shoot base; petioles ascending or erect, greenish, smooth or finely pubescent, 0.5-1.5 cm long.

Inflorescence and Fruit.-- Plants unisexual, the linear and somewhat pendulous catkins produced at time of leaf emergence, the catkin axis villosulous with white hairs, densely so at pedicel nodes and there often also glandular, the pedicels spreading, slender, smooth, to ca. 2 mm long, the ovary developing into an ovoid, greenish, papillose capsule 3-4 mm long, this contracted rather abruptly to a beaklike apex bearing the persistent, short, bilobed style; capsule splitting at maturity from apex to base into 2 spreading valves revealing numerous, white-comose seeds.

Distribution and Flowering Season

Floodplain woods in scattered localities, Coastal Plain from central and southwestern Georgia southward into northwestern and northern peninsular Florida; flowering in March, fruiting in April.

Special Identifying Features

Some doubt must still exist as to the identity of this species. Dr. Chapman, who collected and described S. floridana from the Chipola River bottoms near Marianna, Florida, indicated that it has a shrubby habit, while Drs. Godfrey (pers. comm.) indicates that it can become a tree reaching 75 feet

and more than a foot in diameter. Specimens exhibit a perplexing gradation toward S. caroliniana Michx. (S. longipes Shuttlw.), a true species sharing the same habitat and often occurring with S. floridana. This last tends also to produce hairs on the lower surfaces of its mature leaves, has similar floral and fruit characters, ranges from a shrub to tree size, has similar twigs. However, it must be admitted that trees and shrubs answering to the original description and type of S. floridana are to be found today and Georgia and Florida. These exhibit a range toward a larger, broader leaf than shown by any other southeastern willow and have very white lower leaf surfaces which are quite hairy beneath even in maturity. In willow taxonomy this is an admission of a describable morphology, though the true rank and relationships of this entity would still seem open to various interpretation.

Habitat and Management Implications

S. floridana is an inhabitant of floodplain woodlands in calcareous districts where it is usually on the sandy-silty or limerocky banks of streams and rivers. As is true of most willows in the southeast, its seeds require a wet, sunny substrate for germination and its growth is intolerant of much shade. Thus, while the larger trees are often found in dense swamp forest, these are ultimately shaded out by longer-lived, more shade tolerant, or taller species and the younger specimens are usually found where sun may reach them such as in blowdowns or cleared areas, sunny banks or bars. Associate species may include Taxodium distichum, Sabal, Quercus hemisphaerica, Q. lyrata, Q. muhlenbergii, Q. michauxii, Carya aquatica, Ulmus, Celtis, Magnolia virginiana, Persea, Plantanus, Liquidambar, Nyssa, Forestiera, Fraxinus caroliniana, F. pensylvanica, Myrica, Cephalanthus, etc. The soil is a sandy silt, often inundated, usually at least moist. This particular willow, if seed stock from adjacent area is available, will move into disturbed areas along streams and therefore thinning of competing hardwoods would promote its increase.

References

- Chapman, A. W. 1883. Flora of the southern United States, pp. 452-454. Cambridge.
- Kurz, H. & R. K. Godfrey. 1962. Trees of northern Florida, pp. 27-32. Gainesville.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 412-415. Chapel Hill

SPECIES Salix floridana Chapman. Florida willow

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly					X	X		

Other Comments: Drainage of site would destroy this species!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Salix floridana Chapm.



SARRACENIACEAE

Sarracenia alabamensis Case & Case. Alabama cane-break pitcher-plant

Technical Description

Strongly tufted, rosulate, perennial insectivorous herb.

Leaves.-- Trimorphic, producing persistent phyllodia similar to those of S. oreophila (which see!), followed later by two sorts of pitcher leaves; vernal (earliest) pitcher leaves appearing with flowers, in size and color as well as shape comparable to those of S. rubra, 0.8-5.0 dm long, erect, greenish, softly pubescent, the hood cordate, suberect, 1.9-8.0 cm long, 1.7-6.0 cm broad, pale green, toward the apex of the pitcher and on the hood surface reddish-reticulate-veiny; late season leaves largest, some fully to 6 dm long, dilating gradually from the clasping base, somewhat alate (winged) ventrally, at orifice 3-7 cm broad, the orifice rim recurved, the hood blade ca. 4-10 cm long, 3.5-6.6 cm wide, reniform or cordiform, acutish, erect or slightly arching forward over the orifice, reddish-veiny, often toward apex of pitcher near orifice faintly whitish-areolate.

Flowers.-- Solitary at nodding tips of stiffly erect peduncles 3.5-5.7 dm high, frequently in vigorous plants two scapes (rather than one as in most forms of pitcher plant) being produced from a rhizome tip, each scape at its summit directly under flower producing an involucre of 3 bracts, these usually recurved, triangular, firm, 4.5-6.0 mm long; sepals ovate, 1.7-2.6 cm long, mostly ovate or lance ovate, to 2.2 cm broad, inwardly bent, reddish or greenish tinted with red or maroon; petals 5, distinct, panduriform, 3.5-4.5 cm long, externally blood red, inner surfaces largely pale green, the broadened base narrowed to a short claw attaching petal to receptacle, the blade above the constriction broadly obovate, hanging downward around the broadened style apex; stamens numerous, distinct, the anthers deep yellow; ovary superior, warty, 5-carpellate, nearly round, the style bearing an umbrella-like, peltate disc 3.5-4.2 cm broad, the 5 stigmas borne just below the bifid tips of the 5, recurved disc angles. Fruit and seed not seen.

Distribution and Flowering Time

Fall-line sandhills seeps, swamps and bogs, Autauga, Chilton and Elmore Counties, Alabama; flowering late April into early June.

Special Identifying Features

This plant is described by Case as different on the basis of its production of spreading-recurved, falcate phyllodia (like S. oreophila), reddish flowers as in S. rubra and with similar but sigmoidally curved early pitchers but differing from it in having larger, velvety-puberulent summer leaves. Hybrids between S. rubra and S. alata from Washington County, southwestern Alabama are enough like the Case description as to be placed in this, his new species. As Case and Case (1974) have indicated, S. rubra is extremely variable. McDaniel (1971) states that at least 3 geographical extremes of it exist, and accounted for the S. "alabamensis" populations as one of these. It would thus appear that

further investigation is required before the distinctness of S. alabamensis as a species is accepted.

Habitat and Management Implications

This pitcher plant grows in full sun or light shade, on highly saturated, boggy sphagnum soils, usually in association with various grasses, sedges, and orchids such as Pogonia, Calopogon, Cleistes, Xyris, Eriocaulon, Lachnocaulon, Polygala, Rhexia, etc. Usually it is in clearings amongst shrubs such as Myrica, Alnus, Rhus vernix, Vaccinium; Smilax and Arundinaria are abundant, often dominate this layer. Overstory when present is a mixture of Magnolia virginiana, Ainus taeda, Acer rubrum, Liquidambar, various willow oaks, Nyssa. Reports by Case the first discoverer of the populations, Dr. R. Harper (1921) indicate that the Sarracenia populations were usually in more or less open sites, the shrub competition little and scattered and Case (op. cit.) states that this condition prevailed in the 1950's when he first visited the localities. The same areas today have, presumably through protection from fire, become much more shrubby, to the disadvantage of the Sarracenia. Much of its former area is being invaded by Lonicera japonica which engulfs everything. Other area has been either cleared or drained, converted to pasture or other agriculture. Thus the known localities from S. alabamensis (or these S. rubra!) have become fewer. Adding to the difficulty is the fact that plant "poachers" have visited remaining populations frequently for purpose of getting plants to sell. Areas where this pitcher plant remains should be kept undrained, free from trampling from cattle, periodically moderately burned to release the plants from shrub competition and, if logged, this done selectively with minimal mechanical disturbance.

References

- Case, F.W. & R.B. Case, 1974. Sarracenia alabamensis, a newly recognized species from central Alabama. Rhodora 76 (808): 650-665.
- Harper, R.M. 1922. Some pine-barren bogs in Central Alabama, Torreyia 22: 57-59.
- McDaniel, S.T. 1966. A taxonomic revision of Sarracenia (Sarraceniaceae) Bull. Tall Timbers Res. Sta. 9: 1-36.
- Small, J.K. 1933. Manual of the Southeastern flora, pp. 580-583. Chapel Hill.

SPECIES Sarracenia alabamensis Case & Case, Alabama
cane-brake

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Drainage of site destroys this species!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Sarracenia alabamensis Case & Case



SARRACENIACEAE

Sarracenia oreophila (Kearney) Wherry. green pitcher-plant
S. flava L. var. oreophila Kearney, nom. nud.

Technical Description

Perennial, insectivorous, rosette-forming herb from at stoutish, horizontal rhizome to 1.5 cm thick, this covered by a scaly, brown chaff of old clasping leaf bases plus triangular, acuminate scale leaves.

Leaves.-- Two sorts produced: phyllodial (non-pitcher) type mostly falciform (curved as in a scimitar or sickle), 4-15 cm long, mostly 1-2 cm broad, flattish, attenuated to an abruptly broadened, thin, clasping, pale or reddish base, spreading, more numerous than the tubular (insectivorous) leaves, persistent, developing before and after flowers; tubular type much longer than phyllodes, to 7.5 dm long, dilating gradually from base to rim which is 5-6 cm in diameter and with a narrow, recurved flange, the main veins parallel with the dorsal (midrib) and ventral (zone where margins have fused) ones somewhat raised into low wings; lid of larger pitchers 4-10 cm long, constricted and revolute at its base, widening to an ovate or reniform blade 5-10 cm broad which arches slightly forward above the constriction, is broadly acute or obtuse, sometimes apiculate, with sides broadly rounded at base, there revolute; pitcher body externally yellow-green, the major veins toward orifice often maroon, the lid also green but with principal veins and reticulate side veins particularly within, dark maroon.

Scapes.-- Usually solitary, 3-4 mm thick, green, stiffly erect, 4-7 dm high, terete, fistulose, crooked at tip, thus the flower nodding.

Flowers.-- Regular, bisexual, solitary at nodding scape tips, subtended by an involucre of 3, spreading or recurved, lanceolate or triangular-ovate, yellowish or whitish-green, thin-edged bracts ca. 1 cm long, the tips rounded; sepals 5, distinct, lance-ovate, 4-5 cm long, spreading, then arching downward, apically narrowed but rounded, the backs toward apex somewhat concave, yellow-green, toward the narrowed base reddish; petals 5, distinct, clear yellow, pandurate, ca. 5 cm long, 1/3 from base (attachment) hooked over the broad stigma rim, thus the elliptic to oblong or obovate blade pendulous, its apex rounded; stamens numerous, hypogynous, the filaments slender, smooth, the anthers oblong, versatile, ca. 4 mm long; ovary superior, 5-carpellate, warty, nearly round, abruptly constricted to a short linear style base, this abruptly expanded into a broad, convex, peltate, round (parasol-like), yellow-green style disc 4.0-5.5 cm broad, this radiately 5-nerved, each nerve reddish, terminating in a recurved, bifid-tipped lobe, the stigmatic area located just below the slit within.

Fruit.-- A tardily dehiscent, 5-lobed, nearly globose, warty capsule 1.5-2.0 cm broad; seeds numerous, ca. 2 mm long, irregularly obovoid, warty and foveate.

Distribution and Flowering Time

Bogs, Blue Ridge streambanks and seeps, northeastern Alabama, northeastern

Georgia and an old, doubtful record from coastal Plain Georgia (Taylor Co.); flowering late April into June.

Special Identifying Features

This species is distinguished from the other yellow-flowered pitcher plants by its falcate-recurved phyllodes. The other two species which look like it in pitcher leaf and flower are S. flava L. and S. alata (Wood) Wood, whose phyllodia (when present) are erect and gladiate. S. oreophila has a range apart from any other species save possibly S. rubra (S. alabamensis?) which is red-flowered, has more erect, sigmoidly bent phyllodes.

Habitat and Management Implications

S. oreophila is always on wet, sphagnum sites such as seepy depressions in oak or oak-pine barrens, hillside bogs, or stream and river banks. Its herbaceous associates are mostly grass-sedge, with an admixture of bog orchids, Xyris, Eriocaulon, Lachnocaulon, Drosera, Schoenolirion, Polygala, Utricularia, etc. Shrubs such as Ilex verticillata, Viburnum cassinoides, Alnus, high bush Vaccinium, Itea, etc. are often present, usually increasing and tending to crowd or shade out the pitcher plants and other forbs. In some localities the plants may also be in light shade of open stands predominantly of oak or of oak and pine. The species was once much more widespread in the Blue Ridge and Cumberland Plateau of northern Alabama but has been largely extirpated there due to conversion of boggy areas to crop or pasture land through drainage and plowing, or through creation of farm ponds from bog streams. Light use of areas as cattle pasture appears to have little adverse effect, the main damage appearing to be from trampling rather than browsing. The boggy clearings S. oreophila frequents are usually in various stages of occupation by both shrub and overstory species, so that populations may be observed in various stages of being crowded and shaded out. This is definitely a fire-successional herb (as are most of the other Sarracenia!) and probably was maintained over time by periodic moderate natural fires. Fortunately for S. oreophila, there are several small populations in the relatively inaccessible floor of the Little River canyon, much of which is state-owned.

References

- Komarek, E. V. Sr. 1965. Fire-ecology--grasslands and man. Proc. 4th Annual Tall Timbers Fire Ecol. Conf., 169-220.
- McDaniel, S. 1971. The genus Sarracenia (Sarraceniaceae). Bull. Tall Timbers Res. Sta. (9): 1-36.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 580-583. Chapel Hill.
- Wherry, E. T. 1933. The Appalachian relative of Sarracenia flava. Bartonia 15: 7-8.

SPECIES Sarracenia oreophila (Kearney) Wherry. Green pitcher-plant

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Site drainage destroys this species!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Sarracenia oreophila (Kearney) Wherry



SAXIFRAGACEAE

Ribes echinellum (Coville) Rehder. Florida gooseberry
Grossularia echinella Coville

Technical Description

Spreading, irregularly branched shrubs to 1.5 meters tall.

Shoots.-- Usually several from a knotty, shallow crown, the branches spreading, arching, often rooting at tips where these touch ground, the bark thin, pale gray-brown, on older wood broadly cracking longitudinally to reveal reddish-brown inner bark; new shoots slender, spreading, somewhat zig-zag, pale gray-brown, bearing 1-3 spreading nodal spines to 1.5 cm long, and decurrently ridged from the sides of the leaf scars the length of the internodes; shoot buds ovoid, ca. 4 mm long, the scales imbricate, thin, reddish-brown, ciliate.

Leaves.-- Alternate, close-set on abundant spur shoots or distant on elongated shoots, orbicular on slender, greenish, hirsute to pilose petioles 1-3 cm long, these with abruptly broadly clasping, elongate-glandular-ciliate bases; blades suborbicular, 1-3 cm wide, mostly palmately 3-5 parted, the sinuses mostly sharp, shallow to deep, the lobes cuneate to oblong, their tips dentately or crenately few-toothed, the margins ciliate, the upper surface dark green, smooth or pilose along the veins, the lower surface paler, appressed-hairy.

Flowers.-- Axillary to new shoot leaves, perfect, regular, on slender, spreading or ascending peduncles about as long as the subtending petiole and bearing a white tomentum of villous (crisp) hairs mixed with stiffish, spreading, gland-tipped hairs, bearing also just below the flower a pair of ovate-oblong, green, clasping-based, pilose bractlets: perianth tube narrowly campanulate, its base around the ovary with a dense coating of stiffish, glandular-capitate hairs (these later becoming spines on the fruit), above pilosulous, then spreading into 5 oblong or spatulate, puberulent, greenish, erect calyx lobes ca. 5 mm long which at anthesis become sharply reflexed; petals 5, erect, broadly oblong, 3.0-3.5 mm long, strongly inrolled, widest at the truncate apex, there erose, the bases arising from an hypanthial rim; stamens 5, alternating with the petals, erect, the slender, terete filaments lengthening to 0.8-1.5 cm, the base fixed, oblong, 2-locular anthers ca. 2 mm long, at first cinnamon-red, later purplish; ovary inferior, the style slightly shorter than the stamens, cleft to below the middle.

Fruit.-- A globose to ellipsoidal or ovoid, greenish berry 1.0-1.5 cm long, the surface beset with numerous, spreading, stiffish and gland-tipped prickles, these yellow-green, 3.0-3.5 mm long.

Distribution and Flowering Time

Sandy loams of mixed deciduous forest, Piedmont, South Carolina (McCormick Co.) and northern Florida (Jefferson Co.); flowering from late February into early April.

Special Identifying Features

This species differs from the only other bristly-fruited Ribes of the southeastern area, R. cynosbati, by its smoother leaves (in R. cynosbati the leaves are pilose above), its gland-tipped or capitate ovary and fruit prickles (in R. cynosbati these are not capitate!).

Habitat and Management Implications

R. echinellum is a freely shoot-rooting species of well-drained sandy loams of rich woods in two widely separate localities. In the Florida area it is on southern and southwestern facing lake bluff with an overstory of hardwoods such as Liquidambar, Nyssa, Tilia, Ulmus, live oak, water oak, white oak, shumard oak, and pignut hickory. The understory is Cornus florida, Cercis, Palmetto, Forestiera, Viburnum, Sambucus. Logged areas of the Florida population show an increase of weedy shrubs, particularly Rubus, Sambucus, Smilax, and a reduction of the Ribes. Probably single tree or group selection would not effect the shrubs adversely, so long as this was kept from much mechanical disturbance of the soil. The shrubs are not found in full sun and it is thus quite likely that clearcutting would eliminate or seriously reduce them.

References

- Coville, F. 1924. Grossularia echinata, a spiny-fruited gooseberry from Florida. Journ Agric. Res. 28: 71-74.
- Radford, A.E., H. E. Ahles and C. R. Bell. 1969. Manual of the vascular flora of the Carolinas: 519-520. Chapel Hill.
- Rehder, A. E. 1926. Ribes echinellum (Cov.) Rehder in "New species, varieties and combinations from the Herbarium and the collections of the Arnold Arboretum." Journ. Agric. Res. 28: 71.
- Small, J. K. 1933. Manual of the Southeastern flora, pp. 602-604. Chapel Hill.

SPECIES Ribes echinellum (Cov.) Rehd. Florida gooseberry

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	X	X	X			NA	
Damage								X
No Lasting Effect					X	X		
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Ribes echinellum (Coville) Rehder



SCHROPHULARIACEAE

Amphianthus pusillus Torrey. little amphianthus

Technical Description

Delicate or diminutive, shallow-and-fibrous-rooted annual.

Stems.-- Main axis erect, short (mostly 2-5 mm high), greenish or purplish, the single internode ca. 1 mm wide, longitudinally 4-ridged, at its summit bearing a pair of oppositely spreading, linear-triangular leaves (bracts?) which subtend a central floret which terminates the main axis; primary branches (peduncles?) 2 or more, arising around the central floret, the bases telescoped, ranging from but a few millimeters long to fully 2 decimeters long, depending on water depth, all actually inflorescence branches in an open cyme, all terminating in a pair of spreading, broadish bracts which subtend solitary flowers and which float like pads in the vernal pools.

Leaves.-- Opposite, decussate. Lowermost leaves (those subtending the first flower), linear-triangular, ascending or spreading to 5 mm long, those of the branch bases usually in 2, overlapping pairs and slightly shorter, those terminating the variously elongated terminal internode (inflorescence branch?) spreading, obovate, broadly ovate, or elliptic, mostly 3-5 mm long, rounded to slightly retuse, entire, the bases broadly or narrowly acute, sessile or nearly so, green, often with maroon edges, inconspicuously veined, minutely glandular-punctate.

Flowers.-- Zygomorphic, bisexual, solitary in axils of bracteal leaves, at anthesis erect on short pedicels mostly 0.1-0.2 mm long, these after anthesis recurving and elongating; calyx campanulate, ca. 1.5 mm long, the tube short, the limb oblique, spreading in fruit, the lobes 5, slightly unequal, oblong, ovate or suborbicular, ascending at anthesis, the lowest smallest, narrowest, all blunt or rounded-tipped, greenish or maroon-tinted; corolla white, at anthesis ca. 3-4 mm long, the tube and throat ca. 2 mm long, the 5 lobes nearly erect or slightly spreading, nearly equal, short-oblong, rounded or emarginate, the lower one slightly larger, emarginate; stamens 2, epipetalous 1/2 way up the corolla tube, the filaments capillary, short, ca. 0.3 mm long, the anthers yellowish, nearly round, the sacs slightly divergent, 0.5 mm long; staminodia absent; ovary superior, bilobed, ca. 1 mm high, the style erect, ca. 1 mm long, the stigmatic apex bilobed, the lobes flat.

Fruit.-- An obcordate, tumidly bilobed, 2-locular capsule ca. 3 mm high, carinate along the valve margins, the stalk of the mature fruit usually strongly recurved; seeds numerous, short-cylindrical and curvate (banana - shaped) ca. 1 mm long, dark brown, with numerous prominent longitudinal ridges and slightly less distinct cross lines.

Distribution and Flowering Time

Vernal pools in granite outcrop areas of Piedmont Alabama, Georgia and South Carolina; flowering from late March into April.

Special Identifying Features

A. pusillus, a monotypic genus, is perhaps in floral character most similar to the genus Gratiola. Certainly in Gratiola there are species which show reduction to 2 viable stamens and no staminodes, and which have bilobed, laminal stigmas and similar (though larger) corollas. Seed character in the two general is similar. However, Amphianthus differs from all other southeastern area Scrophulariaceae as follows:

1. The leaves are strongly dimorphic. The lower pairs are subulate, yet from the shoots above the first node of branches a variously elongated (depending on depth of pools) internode develops which terminates in a pair of opposite, much broader leaves that float, padlike, as in Callitriche heterophylla. These elongated internodes have been referred to as pedicels, the floating, opposite leaves as bracts. However Small (1933) and Pennell (1935) refer to them as branches and leaves. In any event, this small plant, above the level of its comparatively stocky first internode, could be said to be mostly inflorescence.
2. The corollas are very small, smaller than in any other southeastern member of the Scrophulariaceae, and are similar to Gratiola or Bacopa, this in contrast to the tumid, obcordate capsules which are similar to those of Veronica.

Habitat and Management Implications

Amphianthus grows in full sun in and around edges of vernal pools on granite, its roots in the shallow, sandy-silty wash that accumulates there. In dry seasons it often does not appear, the seeds appearing to lie dormant until favorable winter moisture conditions develop. Length of elongate, round-bracted pedicels varies depending on water depth. Associated species in and around the pools are usually Isoetes spp., Diamorpha cymosa, Arenaria uniflora, A. glabra, Lindernia monticola, Juncus georgianus, Agrostis, Panicum, etc. Where there is sufficient soil depth over the granite an oak-yellow pine forest community usually forms, this generally with an understory of Rhus, Vaccinium, Chionanthus, Calamintha, Hypericum, etc. The vine Gelsemium sempervirens is common, as are Smilax, Anisochistus, Campsis, Vitis. Only the deeper, more permanent pools support Amphianthus and such pools are rare even in the best localities. Shade eliminates this plant. The main threat to known populations appears to be a combination of destruction of the granite outcrops by quarrying and damage done to the small pools by hikers and motorcyclists.

References

- McVaugh, R. and J.H. Pyron. 1937. The distribution of Amphianthus in Georgia. Castanea 2: 104-105.
- McVaugh, R. 1943. The vegetation of the granite flat rocks. Ecol. Monogr. 13: 120-166.
- Pennell, F.W. 1935. The Scrophulariaceae of eastern temperate North America. Acad. Nat. Sci. Philadelphia, Monogr. 1: 110-112.

Torrey, J. 1837. An account of several new genera and species of North American plants. Ann. Lyc. Nat. Hist. N.Y. 80-94.

Small, J.K. 1933. Manual of the southeastern flora, pp. 1193-1194. Chapel Hill, N.C.

SPECIES Amphianthus pusillus Torr. Little amphianthus

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	NA	NA	NA			NA	
Damage								X
No Lasting Effect								
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Amphianthus pusillus Torrey



SOLANACEAE

Solanum carolinense L. var. floridanum Chapm. Florida horse-nettle
S. floridanum Shuttlw. ex Dun. in DC. non S. floridanum Raf.
S. godfreyi Shinnars

Technical Description

Woody-based, monoecious perennial herb from a deep-set tuberous rootstock.

Stems.-- Erect or spreading, simple to copiously branching, 2-6 (-10) dm tall, terete, yellow-green save for thin, cracking brownish bark at stem base, the surface smooth toward stem base, upwardly with scattered stellate hairs, (these most abundant toward shoot tips) also sparingly to copiously armed with stiff, stout-based, spreading yellow spines to 1 cm long.

Leaves.-- Alternate, simple, petiolate, the lowermost usually absent by flowering time, those toward middle of main axis largest, the blades deeply pinnately lobed, mostly 8-15 cm long, the lobes ranging from oblong to triangular, their tips rounded to acute, symmetrical or oblique, the sinuses broad; upper leaf surface deep yellow-green, with scattered stellate pubescence; lower surface paler, more copiously stellate-hairy, also spine-armed at least along the prominent mid-vein, sometimes along the major branch veins.

Inflorescence.-- Racemes developing between all or most upper leaf nodes, spreading-ascending, mostly 6-12-flowered, coiled toward their tips, much elongating during the long flowering season, the female flowers lowermost, the axis spinose and stellate-hairy.

Flowers.-- Regular, unisexual on spreading (in female becoming reflexed) slender, stellate-hairy pedicels reaching ca. 1 cm by anthesis; sepals 5, united, the calyx campanulate, green, stellate-hairy, the tube 2.0-2.5 mm long, the 5 ascending or spreading lobes subequal, narrowly triangular-subulate; petals 5, united, the corolla rotate, 3-4 cm wide, the spreading lobes 1.0-1.5 cm long, triangular, the surface from white to lavender, the lobes stellate-purulent medially on the backs, otherwise smooth; stamens 5, epipetalous toward corolla base, the stocky pale filaments ca. 1 mm long, the basifixed, linear-oblong, erect anthers yellow, ca. 1 cm long, opening by terminal pores; ovary superior, broadly ovoid, smooth or with scattered simple hairs, the style short-linear.

Fruit.-- Berries born on stiffly recurved stalks to 2 cm long, these gradually dilated toward apex, the calyx not enlarged but persistent around fruit base; body of fruit globose, 1.0-1.5 cm thick, gummy-meated, ripening yellow or orange-yellow; seeds numerous, flattened, nearly round, 2.5 mm broad.

Distribution and Flowering Time

Sandy clearings and open woodlands, northern Florida and adjacent south Georgia; flowering intermittently from late spring through the growing season.

Special Identifying Features

S. carolinense var. floridanum is distinguished from S. carolinense proper by its deeper pinnatifid leaves, but because of the frequency of intermediate leaf forms between the varieties, should perhaps be considered merely a form.

Habitat and Management Implications

This Solanum is found on sandy soils, usually in clearings in disturbed, open hammocks, in fields or along roads. Sometimes it is found in swamp woodlands, but there only on sandy rises, usually where there has been some soil disturbance. This is usually where there has been some soil disturbance. This is plainly a weed, sometimes invades gardens or cultivated fields. Its tendency to grow along railroads, or highways, or in gardens, old fields and empty lots in towns would appear an indication that it would persist, even increase in numbers, with disturbance.

References

- D'Arcy, W.G. 1974. Solanum and its close relatives in Florida. Ann. Mo. Bot. Gard. 61: 819-867.
- Chapman, A.W. 1860. Flora of the southern United States, p. 349. Cambridge, MASS.
- Shinners, L.H. 1962. Solanum godfreyi Shinners, nom. nov. Sida 1: 108.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1112-1116. Chapel Hill, N.C.

SPECIES Solanum carolinense L. var. floridanum Chapm.
Florida horse-nettle

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy							X	
Damage								
No Lasting Effect		X	X	X				X
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Solanum carolinense L. var. floridanum Chapm.



TAXACEAE

Taxus floridana Cahpm. Florida yew

Technical Description

Faintly but pleasantly aromatic, broad-and-flattish-crowned, smooth, mostly dioecious shrub or small tree at most to 8 meters tall, the trunk usually leaning, usually asymmetrical, the bark thin, purplish-brown or gray-brown, separating into small plates.

Branchlets.-- Slender, often spreading, the newest growth pale green, covered with the flattened, spiralled, adherent sterigma bases, these later turning brownish or reddish-purple as the bark forms.

Leaves.-- Spirally arranged but twisted on the "petiole" so as to form flattened sprays or a broad "v" trough, linear, mostly 1.0-2.5 cm long, soft, ca. 2 mm broad, short-acuminate to a sharp but weak point, entire and concavely revolute, the upper surface a deep, lustrous green, the lower surface much paler, yellow-green, with 2 strong stomatiferous bands one on each side of the raised midrib, the blade narrowing to an ascending or erect, petiole-like constriction ca. 1 mm long, this articulated to the decurrent, flattened sterigma base.

Male Reproductive Structure.-- Male cones subglobose, yellowish roundish, ca. 3 mm broad, projecting on short, erect stalks slightly beyond the tips of acuminate tips of axillary, imbricate-scaley "flower buds", the sporangia borne under heads of tack-like sporophylls, these produced in a few whorls in each cone.

Female Reproductive Structure.-- Ovules erect, solitary, each enclosed in a small, imbricate-scaley, pale green axillary bud (which much resembles an ordinary shoot bud), with only the micropylar end of the aril protruding. Ripe oval ovoid or obovoid, ca. 5-7 mm long, in a globular fleshy, red aril cup nearly 1 cm broad.

Distribution and Flowering Time

Understory to mesic (or swamp) forest species in steep ravines (rarely swamps) mostly along the east bank of the Apalachicola River in Gadsden and Liberty Counties, Florida (also in a Chamaecyparis swamp ca. 8 mi. southeast of Bristol). Pollen shed and received during March.

Special Identifying Features

T. floridana is unlike any other gymnosperm within its small range, its nearest eastern North American relative being T. canadensis, a lower species of the north and northeast, locally into the southern Appalachians but still removed in range several hundred miles. In some ways it superficially resembles Torreya, but has shorter, narrower, softer foliage and a much different aril character (for details consult information under Torreya taxifolia!)

Habitat and Management Implications

T. floridana is usually in the same habitat as Torreya taxifolia (which see!), though, as noted above, it has one anomalous habitat. It is a shade requiring species so that logging disturbance of the overstory would create a much drier, sunnier, warmer site than it or its reproduction would tolerate. The largest numbers of this rare species are now found within the boundaries of Torreya State Park. Outside the Park, on private lands, the main danger faced by the species is from excessive cutting of overstory species of pine and hardwood, this admitting too much light and heat and also accelerating soil erosion on the steeper sites.

References

Kurz, H. & R.K. Godfrey. 1962. Trees of northern Florida, pp. 1-2. Gainesville.

Nuttall, T. North American Sylva III: 92.

Sargent, C.S. 1921. Trees of North America, Dover Press ed., pp. 95-95.

Small, J.K. 1933. Manual of the southeastern flora, p. 12. Chapel Hill.

SPECIES Taxus floridana Nutt., Florida yew

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	X	X	X		X		
Damage					X			*
No Lasting Effect								
Beneficial if Done Properly								

Other Comments: Taxus is one of the most deadly stock poisons!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Taxus floridana Chapman



TAXACEAE

Torreya taxifolia Arn. Florida torreya
Tumion taxifolium (Arn.) Greene

Technical Description

Small, dioecious tree (formerly to ca. 18 meters tall, 6 dm dbh), usually with but a single, evenly tapering bole, the bark thin, grayish or gray-brown, braided and shredding cedar-like, the inner bark orangish, the fresh-cut wood unpleasantly pungent. Crown broadly pyramidal, the main branches whorled, spreading or slightly declined, the ultimate branching plane, stiff. Branchlets smooth, arising mostly oppositely from scaly shoot buds developing from swollen branch tips and branch nodes, green, smooth, narrowly grooved between the elongate, flattened, spirally arranged sterigma bases.

Leaves.-- Evergreen, smooth, persistent 3-4 years, spirally arranged but by a "petiolar" twist appearing distichous (in 1 plane) much as in the yews, rigid, lance-linear, 2-4 cm long, ca. 3-4 mm broad, rigidly subulate-tipped, concavely revolute, narrowed at base to a petiole-like constriction ca. 1 mm long which includes the "joint" connecting it to the jutting sterigma apex which in turn flares to a flattened sterigma base adherent to the branchlet; upper leaf surface a dark lustrous green; lower leaf surface dull pale green with a broad pale stomatiferous band on either side of the raised midrib.

Male Reproductive Structure.-- Microsporangia clustered, pendulous on sporangiophores clustered in round, small, yellowish cones ca. 5 mm long, on stiffly spreading stalks from tips of stramineous ovoid, imbricate-scaly axillary buds.

Female Reproductive Structure.-- Ovules arising singly and terminally from imbricate axillary buds, erect, nearly sessile, only the micropyle projecting from the enfolding bud scale tips; ripe ovule in size and shape comparable to a green olive, ellipsoidal, smooth, 3-4 cm long, green and glaucous, later turning purple, the aril (fleshy covering of seed) fleshy, later leathery, somewhat thin, the seed coat within woody.

Distribution and Anthesis

Rich wooded slopes or rises in calcareous bottoms, Apalachicola River basin, northwestern Florida and southwestern contiguous Georgia with a presently known range including but 3 counties in Florida, 1 in Georgia. Shedding and receiving pollen in March and April.

Special Identifying Features

This small tree, whose nearest relative is Torreya californica, a species confined to the western slopes of the Sierra Nevada and coast ranges of California, bears no resemblance to any other southeastern area gymnosperm unless it be Taxus floridana, a species of yew with a similar habitat and range. The yew differs in having a lower, more spreading crown, shorter,

softer leaves, and a much smaller ovule surrounded by a fleshy, cuplike, bright red aril.

Habitat and Management Implications

T. taxifolia grows as understory in rich hardwood hammock forest. The soil is a rich, dark, moist sandy loam, the best stands once on steep sides of ravines at and below Chattahoochee southward to Bristol along the east side of the Apalachicola River. Overstory species include Magnolia grandiflora, several species of Quercus (particularly Q. alba, Q. nigra, Q. shumardii, Q. falcata, Q. hemisphaerica), Carya, Fraxinus, Acer saccharum subspecies, Acer rubrum, Pinus glabra, P. taeda, etc. Associated understory species include Cornus florida, Cercis, Magnolia pyramidata, M. ashei, Persea, Myrica, etc. Clearcutting of the hardwoods and pine, some of which are large and valuable has in the past had an adverse effect on the Torreya trees which are intolerant of much light. One of the best areas for the trees was Torreya State Park where the main danger to them (as in other areas) was once the rampant rooting up of seedlings and young specimens by uncontrolled numbers of wild hogs. This trouble could have been overcome, but in the early 1960's the trees throughout their small range were attacked by a root rot organism which destroyed all of the larger specimens. Today there are but few survivors, these, in the main, widely scattered young trees or suckers from root systems of older individuals. The prognosis for this species in the wild is bad. There are a few large specimens still undamaged in cultivation in botanical gardens or nurseries from which cuttings are occasionally rooted but moving of these back to original localities will be difficult.

References

- Arnott, G. 1838. On the genus Torreya. Ann. Nat. Hist. 1: 126-132.
- Kurz, H. and R.K. Godfrey. 1962. Trees of northern Florida, pp. 2-3. Gainesville, FLA.
- Sargent, C.S. 1921. Trees of North America, Dover Press ed., pp. 91-92.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 11-12. Chapel Hill, N.C.

SPECIES Torreya taxifolia Arn. Florida torreya

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	X	X	X		X		
Damage					X			
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Torreya taxifolia Arn.



VERBENACEAE

Verbena tampensis Nash. Tampa vervain
Glandularia tampensis (Nash) Small

Technical Description

Perennial herb from a short shallow rhizome or from short lateral offshoots.
Stems.-- Few to several, erect to ascending, but usually decumbent, often rooting from lower nodes, mostly 3-6 dm long, sometimes leaning on other vegetation, quadrangular, sparingly to copiously strigillose from base to inflorescence, usually purplish or purplish-green.

Leaves.-- Opposite, the basal smallest, the largest usually at or about mid-stem, these grading gradually smaller upward to an essentially leafless, variously elongate peduncle; blades mostly ovate, acute, mostly 4-6 cm long, the margin unevenly coarsely serrate, rarely incised-parted below the middle, the base broadly cuneate, then abruptly attenuated, the prominent (1-3 cm) petiole thus wing-margined to near its base; upper leaf surface dark green, strigillose; lower leaf surface paler, strigose along the veins, strigose-puberulent between.

Inflorescence.-- A more or less prominently pedunculate indeterminate bracteate spike, this at first compact, nearly as wide as long, later elongating to as much as 1 dm, with the lower flowers (by then fruit) scattered; bracts linear-lanceolate, coarsely ciliate, strigillose, shorter than the calyx.

Flowers.-- Slightly zygomorphic, bisexual; calyx tubular, ca. 1 cm long, the tube 5-ribbed, greenish, strigillose, the ribs purplish, prolonged to become the midribs of the 5, narrowly triangular-subulate, unequal calyx lobes: corolla slightly zygomorphic, salverform, the pale tube to 1.5 cm long, puberulent, the spreading limb 1.5-1.8 cm broad, the lobes short-oblong or obovate, usually apically notched, the lowest largest, the rim densely coated with short, white, glandular hairs, the upper surface a deep lively lavender, the lower surface pale; stamens 4, diadelphous, attached high in the corolla tube; ovary superior, short-oblong, shallow 4-lobed, the style elongate, linear, shorter than corolla tube, apically dilated into a 2-lobed concave, glandular stigma.

Fruit.-- Of 4 oblong-linear nutlets ca. 4 mm long, toward the rounded apex ridged-reticulate, toward the somewhat broadened base longitudinally ridged, the inner (contact) faces toward apex with fine, white papillae.

Distribution and Flowering Time

Sandy coastal hammocks, clearings, middle and southern peninsular Florida; flowering all year, but mostly March to June.

Special Identifying Features

Some problems exist in distinguishing this from the widespread (extending southward into northern peninsular Florida) V. candensis, and southern peninsular Floridan V. maritima. It is supposed to differ from both in its

shorter corolla tube which is but little (less than 1/2 longer) longer than the calyx, and the tendency for its leaves to be less parted or deeply incised. Its corollas are broader-limbed than is true normally for V. maritima. However, where V. canadensis overlaps in range, there are morphological intermediates, particularly with V. maritima. Even "good" V. tampensis will show some range in length of corolla tube on the same plant, thus the strongest character is perhaps not consistent.

Habitat and Management Implications

V. tampensis is a species of well drained sandy clearings or open hammocks, mostly of the cabbage palmetto-live oak type or in slash or longleaf pine-saw palmetto flats, generally not far from the present seacoast or at least along tidally influenced rivers inland. It is often found in disturbed areas, is often in or by recent clearings. Drainage may increase its area, as may soil disturbance to create sandy openings, and its presence in fire-disturbed pinelands would indicate that it is not negatively responding to fire.

References

- Long, R.W. and O. Lakela, 1971. A flora of tropical Florida, pp. 740-742. Miami, FLA.
- Perry, L. 1933. A revision of the North American species of Verbena. Ann. Mo. Bot. Gard. 20: 239-363.
- Small, J.K. 1905. Bull. N.Y. Bot. Gard. 3: 436.
- _____. 1933. Manual of the southeastern flora, pp. 1128-1129.

SPECIES Verbena tamensis Nash. Tampa vervain

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect	x							
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Verbena tampensis Nash



SARRACENIACEAE

Sarracenia psitticina Michx. parrot pitcher-plant

Technical Description

Rhizomatous, rosette-forming, smooth, scapose, perennial, insectivorous herb.

Stems.-- Short, usually ascending, densely covered by spirally arranged leaf bases, arising from stoutish, variously elongate, shallowly set rhizomes.

Leaves.-- Of two sorts, one scale-like (squamelloid), deltoid, acuminate, overlapping, on the rhizome, the other ascidiform (joined by the margins to form a "pitcher") mostly 8-15 (-20) cm long, making up the rosette, the bases clasping, overlapping, in a tight spiral, spreading-ascending, viewed from the side sigmoid with the apex incurved, the petiole gradually widening distally, on the ventral (upper, in) side flattening and dilating into a broad wing, this broadest in the upper 1/3 and narrowing more abruptly into the pitcher rim, the pitcher tube very narrowly funnelform, toward the apex purple-reticulate, the areolae pale, translucent, the pitcher hood saccate-ovoid, "bubble-like", acute, incurved over the pitcher orifice, its inflated back purple-reticulate, also with translucent, pale areoles.

Inflorescence.-- Flowers solitary, nodding at apex of terete, fistulose, scales mostly 15-30 cm long, perfect, regular; bracts 3, whorled, oblong-triangular, blunt, reddish-green or maroon, ca. 5-8 mm long, spreading or reflexed; sepals mostly 5, bluntly ovate-triangular, 2-3 cm long, spreading-incurved, the backs maroon, the upper surfaces paler, usually greener; petals mostly 5, 2.0-4.5 cm long, the short, pale claws hooked over the petalate stylar apex, the oblong-ovate, panduriform (like violin body) blades reddish-maroon, flat, pendulous; stamens numerous, the sigmoid or straight, slender pale filaments fascicled, of various lengths, the anthers dorsifixed, horseshoe-shaped ca. 2 mm long, 2-locular, extrorse, these and the filaments concealed by the umbrella-shaped, pale yellow-green stylar apex; ovary superior, 5-locular, the stigmas "teat-like" at and below the bifid apex of the angles of the style lobes.

Fruit.-- A subglobose, loculicidal capsule ca. 1 cm broad, moderately tuberculate; seeds bluntly obtriangular, 1.5-2.0 mm long.

Distribution and Flowering Time

Bogs and margins of acid flatwoods ponds and streams, clearings in cypress swamps, Coastal Plain, southeastern Georgia south to northeastern Florida and westward through the Gulf Coastal Plain into the Florida parishes of Louisiana; flowering from late March through May.

Special Identifying Features

This pitcherplant is the only one in the southeastern area to combine small size of pitcher with the odd "bubble-like" pitcher hood, broad pitcher wing, small purplish-maroon flowers (similar superficially to those of S. rubra), and an areolar pattern similar to that of S. leucophylla and S. minor. It hybridizes in nature with S. purpurea (S. catesbaei), with S. alata (ac-

according to Dr. S. McDaniel, whose treatment is consulted in preparation of this report).

Habitat and Management Implications

S. psittacina, as is true of the other Sarracenia, is a plant of boggy, high-hydroperiod, peaty or sphagnum sites such as are found in flatwoods depressions, seep slopes, acidic swamps, wet savannas, or bogs. It is usually in full sun or light shade, is part of a grass-sedge formation, tends to be crowded and shaded out by invading shrub or tree complexes, and tends to increase when this is reduced either by clear-cutting or fire. It is totally eliminated or drastically reduced by any form of mechanical site preparation, either in the first process, which usually also involves drainage ditching of the wetlands or later, when the planted or seeded pine closes over the grass-sedge formation and shades it out. This small, interesting species is also much abused by those who dig up the plants for sale. Management to maintain it and other pitcher plant species has to involve controlled burning to retard forest successional pressures, together with a light enough stocking of pine (preferably longleaf or slash) to insure that enough light reaches the plants, and an absolute adherence to a high soil moisture regimen.

References

- Harper, R.M. 1918. The American pitcher plants. J. Elisha Mitchell Sci. Soc. 34: 110-125.
- McDaniel, Sidney. 1971. The genus Sarracenia (Sarraceniaceae). Bull Tall Timbers Res. Sta. 9: 1-26.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 580-583. Chapel Hill, N.C.

SPECIES Sarracenia psittacina Michx. Parrot pitcher-plant

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Site drainage destroys this species!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Sarracenia psittacina Michx.



OPHIOGLOSSACEAE

Ophioglossum palmatum L. hand adder's-tongue fern
Cheiroglossa palmata (L.) Presl

Technical Description

Epiphytic perennial fern from a round-tuberos rhizome, the rhizome surface covered by a wooly chaff of narrow scales, the roots fleshy, containing endophytic fungus.

Fronds.-- Glabrous, usually 2 or 3 from the rhizome, the "petiole" fleshy but flattened, narrowly strap-like, dilating distally into a pendulous, hand-like, similarly fleshy but flat blade, this broad, 1-4 dm long (nearly as wide or wider), dissected into 2-9, oblong or broadly linear, erect or flabellately spreading lobes, these narrowed acutely, acuminate or rounded, truncate or even retuse, and varied in length (rarely undivided as in the "normal" adders - tongue species), often reminiscent of Laminaria type kelp, the frond base attenuated to the stalk, the venation areolate (anastomosing, closed); fertile segments (1-) 2-many (-16) arising from the upper rachis or from the blade base, the massive, rounded sporangia many in 2 continuous rows in linear spikes, these mostly linear-oblong, 2.5-5.0 cm long, on narrower ascending stalks as long as the spikes or longer.

Distribution and Sporing Season

Epiphytic, in the "wickerwork" of old petiolar bases of cabbage palm, moist rich hammocks, peninsular Florida; producing spores all year.

Special Identifying Features

The family Ophioglossaceae is distinguished from other ferns by a combination of tuberous rhizome, sporangia massive, in spikes or panicle-like clusters from stipe or leaf. Two genera are native. Ophioglossum is distinguished by the anastomosing (closed) frond venation, the simple or less-dissected leaf, the sporangia borne in spikes (in Botrychium the usually more dissected frond has open venation, the sporangia are produced in branched (panicled) systems). All other Ophioglossum in North America have vegetative leaves simple, unlobed, and are smaller plants than O. palmatum, which is also distinguished by its unique ecological niche and exclusively epiphytic habit.

Habitat and Management Implications

O. palmatum almost invariably is found on Sabal palmetto, is commonly associated with various Bromeliaceae, ferns such as Polypodium aureum, Vittaria lineata. However, the Ophioglossum has a unique niche on the palm in that its fleshy, fuzzy rhizome is imbedded in the detritus that collects within the large persistent petiole bases of the palm. The stipes of the frond grow upward and out from behind the palm petiole bases, protruding and bending downward apically, thus the "hand-like" blade droops. The plants are most abundant in the moister hammocks, thus are more abundant where there is often shallow standing or flowing water a good part of the year, less abundant

on palms of hammock edges or in open or dryer hammock. Since the "wickerwork" of palm petiole bases ultimately breaks away from the bole, the fern falls with these old petioles and dies. Thus, the greatest threat to this once (according to Small) abundant fern comes with fire which, while it may not kill the palm, will burn away the old leaf bases which are the habitat of the fern. Since most of the original cabbage palm hammock of Florida has been burned severely at least once, protection of what is left of this habitat is mandatory. Some hammocks are still being burned to "open" up area for livestock. Other hammock habitat has been lost through drainage and subsequent industrial and/or residential development; still more has been drained for conversion to Citrus culture.

References

Small, J.K. 1938. Ferns of the southeastern states, pp. 346-379. Lancaster, Pa.

SPECIES Ophioglossum palmatum L. Hand adder's-tongue fern

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	X	X	X		X	X	
Damage					X			X
No Lasting Effect								
Beneficial if Done Properly								

Other Comments: Burning over of cabbage palm hammock has
destroyed this species over much of its range.

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Ophioglossum palmatum L.



ASCLEPIADACEAE

Matelea floridana (Vail) Woodson. Florida milkvine.

Vincetoxicum floridanum Vail

Odontostephana floridana (Vail) Alexander

Technical Description

Perennial, milky-juiced, herbaceous, twining vine from a stout-rooted rootstock.

Stems.-- Slender, terete, but faintly longitudinally ribbed, prostrate unless there is something to climb on, always a twiner when there is, variable in length, vigorous growth to several meters long, simple or intermittently branched, the surface yellowish-green, but often strongly maroon-tinted, pubescence a mixture of long spreading hairs (hirsute) mixed with short hairs, some of these tipped with red glands.

Leaves.-- Opposite, the petioles stiffly spreading, strongly ribbed, mostly 2-6 cm long, the longest lowest, pubescent as in stems; blades cordiform, ovate to suborbicular, apically acuminate, the margin entire and bristly-ciliate, the base cordate or often auriculate with the sinus narrowly rectangular or closed, the whole blade often to 1.5 dm long but usually much shorter upward on stem; upper surface dark yellow-green, puberulent, sometimes sparsely hirsute along the veins, the lower surface paler, soft puberulent, along the strongly raised veins puberulent and hirsute, with some of the short hairs red-glandular.

Inflorescence.-- A simple, axillary, pedunculate, few-to-many-flowered umbel, the peduncle ca. 1 cm long, slightly shorter than the rays, ribbed, puberulent, maroon-tinted, the pedicels slender, stiffly spreading, mostly 1.0-1.5 cm long, glandular-puberulent, each usually subtended by a narrowly linear, green, hirsute bract ca. 5 mm long.

Flowers.-- Perfect, regular, between 1.0 and 1.5 cm across; sepals 5, 2.5-3.0 mm long, spreading, triangular-ovate, narrowly acute, green or maroon, faintly reticulate-venose, hirtellous; petals 5, spreading, joined at very base, flat, 0.7-1.0 cm long, deep to pale maroon or yellowish-green, narrowly ovate, broadly acute, entire, the backs inequilaterally puberulent, the margins this, a narrow, entire, pale band, the upper surface smooth; crown thin, maroon, broadly low-triangular-lobed, each tip tridentate, each sinus with 2 narrowly triangular teeth; gynostegium flat-topped, low, greenish, the truncate summit 5-obtuse-angled, each interval bearing an inward-projecting, thin, pale scale; ovary superior, bicarpellate, the two ovoid, apically incurved, distinct carpels hidden and developing under the peltate gynostegium and the corona.

Fruit.-- Follicles 2, lance-cylindric, apically attenuated, ca. 7-10 cm long, yellowish when ripe, strongly fleshy-spined; seeds flattish, numerous, ca. 5 mm long, ovate, dark brown, each with a strong tuft of white, silky capillary hairs.

Distribution and Flowering Time

Hammocks, open dry woodlands, northern and central peninsular, rarely panhandle Florida; flowering from late May to July.

Special Identifying Features

There are no more difficult plants to work with than the asclepiads, in that much of the taxonomy is based on complex floral appendages. The perianth is rather straight forward in most genera, being made up mainly of 5, usually nearly distinct, sepals and of 5, similarly nearly distinct, spreading or incurved petals. Problems come with parts internal to these, first with what is termed "corona" which in Matelea is made up of a disc-like, usually thin, outgrowth from the summit of the short corolla tube; this may also involve some tissue from the stamen. Only in a few general (these primitive) are the 5 stamens distinct: instead they are usually adnate to (pressed against) the gynoeceum and produce a short to long columnar truncate-headed structure called a gynostegium (much as in orchids), and in ours the anthers are 2-celled, bilocular, the pollen sticking together in waxy masses (pollinia) in each anther sac, and each anther connected in a stamen by an inverted slender "V" of tissue called the "translocator", the arms of which terminate in a pollinium and are joined by a chitinous, small, usually dark brown zone called "gland". The glands, 5 in number, are usually visible at anthesis at the angles of the gynostegial head at the tips of longitudinal slits in the gynostegium. The gynoeceum is made up of 2 superior ovaries, these joined apically by their styles and at the very stigmatic tips forming most of the truncated, 5-angled surface of the gynostegium. I think that the discussion above indicates what the problem is, in that most of the taxonomy with these plants involves knowing the character, size and appendages of the above-described parts. Matelea is distinguished from other viney milkweeds by its bearing a corona at the gynostegial base, this forming 1-2 series, the rims of which are variously toothed or lobed. In fruit these "Bristlepods" look like milkweeds, usually with but one ovary of a pair ripening. Not all Bristlepods have bristly ovaries and fruit, thus such species as M. gonocarpa, M. suberosa may be eliminated from confusion with M. floridana, which does. M. floridana is distinguished from its nearest relative, M. carolinensis (Jacq.) Woods in that it has somewhat smaller flowers, each with an apparently 5-lobed crown, the surfaces of which are predominantly nearly black. The larger flowers of M. carolinensis have a 10-lobed crown.

Habitat and Management Implications

M. floridana grows in a variety of wooded habitats which may be quite mesic, as in and around wooded limesink areas or relatively dry, as in open oak-hickory or oak-hickory-pine uplands. The substratum is usually a moist to dryish sandy loam. In the moister "hammock" sites the overstory may be an admixture of Magnolia grandiflora, beech, maple, Liquidambar, Quercus in the willow oak group, water oak, live oak, various hickory, ash, etc., sometimes with cabbage palm admixed, often with palmetto, various Ilex, Cornus, Asimina parviflora, in the understory. In the drier sites the overstory is usually a mixture of longleaf pine, live oak, scrub live oak, deciduous scrub oaks including Q. laevis, Q. margaretta, Q. velutina, Q. falcata, etc., and the understory of various heaths, particularly Vaccinium, Gaylussacia, Lyonia, running oaks such as Q. pumila, Q. minima, saw palmetto, Zamia, Asimina, etc. Sometimes the sites are dry enough to support large patches of Chrysobalanus oblongifolius. Herbaceous associates are often suggestive of dryish savanna woodlands, include wiregrass, various upland Andropogon, Dichanthelium, Panicum, Polygala incarnata, P. polygama, Rhynchosia, Baptisia, Desmodium, Lespedeza, Stillingia, Asclepias tuberosa, Ansonia ciliata, Paronychia, many Asteraceae including various Aster, Solidago, Heterotheca, Tetragonathea, etc. I have now seen many populations and note (as has the far more experienced Dr. Drapalik, the authority on the genus!) that most of these are largely non-flowering

and that this is where the overstory and understory is most complete in development. The best flowering populations appear to be where there has been recent disturbance, usually involving woods fires or logging or a combination thereof.

Thus, within the rather narrow range of this species, its management would be in line with practice for natural stands of longleaf pine, which is a common overstory species. The mechanical disturbance of the soil involved with most site preparatory techniques would probably have an adverse effect, except where contiguous seeds sources might be available to colonize bare areas. There is considerable risk here, however, in that (as mentioned above) populations are often sterile. Where these milkweeds are in rich hammock, selective logging may create small openings suitable for them; clear cutting would, however, promote weedy understory plants, particularly Pueraria, Lonicera, Smilax, Rubus, which would tend to crowd out these vines.

References

- Drapalick, D.J. 1970. A biosystematic study of the genus Matelea in the southeastern United States. Unpublished Ph.D. dissertation, University of North Carolina, Chapel Hill.
- Shinners, L.H. 1964. Texas Asclepiadaceae other than Asclepias. Sida 1 (6): 358-367.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1076-1078. Chapel Hill, N.C.
- Vail, Anna M. 1899. Studies in the Asclepiadaceae. Bull. Torr. Bot. Club 26: 423-431.
- Woodson, R.E. 1941. The North American Asclepiadaceae I. Perspective of the genera. Ann. Mo. Bot. Gard. 28: 193-244.

SPECIES Matelea floridana (Vail) Woods. Florida milkvine

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy							X	
Damage		X	X	X				X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Matelea floridana (Vail) Woodson



ASTERACEAE

Cacalia rugelia (Shuttlw, ex Chapm.) Barkley & Cronq. Rugel's indian-plantain
Senecio rugelia A. Gray

Technical Description

Perennial, soft and brittle-foliaged herb, essentially rosulate, perennating by stout, ascending, rhizomatous offshoots.

Stems.-- Rhizomes stout, variously elongate, shallowly set in the duff, ascending, toward apex densely cloaked in the overlapping old scale leaves, these densely spirally imbricate, grading abruptly into rosette leaves at rhizomal apex.

Leaves.-- Principally and largest in the rosette, very much in size and outline reminiscent of Plantago major, P. rugellii or P. cordata, namely spreading or erect, mostly 10-20 cm long, slightly over half of the flat but thickish-succulent petiole, the blades broadly ovate, soft, flat, acute or short-acuminate, the margins distantly but regularly denticulate, the denticles callus-tipped, the base rounded, truncate, even slightly cordate, in any event then abruptly decurrent on the petiole to its base, the upper surface deep green, sparsely appressed-floccose, much paler and somewhat more floccose on lower side and petiole.

Inflorescence.-- Scapes rigidly erect, usually 1, rarely 2/plant, mostly 20-40 cm tall, terete, longitudinally low-ribbed, glandular-pilosulous, dull green, with several small, distant, alternate, spreading bracteal leaves, these sessile or short-petiolate (the lower ones sometimes approaching rosette leaves in shape, but much smaller), narrowly ovate to broadly lanceolate or elliptical, with pubescence as in rosette leaves and grading into even smaller peduncular bracts. Heads mostly 3-6, in a short, determinate, bracteate raceme, terminating long, erect peduncles usually much longer than the heads so that all approach one another to form an elliptical or oval pattern, at anthesis broadly campanulate, from base of receptacle to tip of florets ca. 2 cm high, and about as wide across the pappus tips, the receptacle naked, somewhat concave, the phyllaries thin, greenish, erect, in essentially 2 series, fused toward their bases, ca. 1 cm long, lance-linear, with the inner series somewhat broader, acute to acuminate, broadly scarious-margined apically, inconspicuously parallel-nerved, smooth or scattered-puberulent on the backs; florets numerous, all discoid, perfect, the corolla cream, ca. 8-9 mm high, its base narrowly tubular, expanding to a broadly tubular upper half, the 5 triangular lobes spreading at a level about even with the tips of the numerous capillary, white pappus bristles, the anther cylinder narrow, purplish, definitely exserted at an angle beyond the corolla orifice, the 2 somewhat flattened style branches apically subcapitate, truncated, bristly-tipped.

Fruit.-- Akenes columnar, smooth, ca. 4-6 mm long, 0.8 mm wide, with many, 10 longitudinal ribs, pale brown; pappus as described above.

Distribution and Flowering Time

Rich, moist coniferous woods at high elevations in the Blue Ridge Mountains of Tennessee and North Carolina; flowering late June to September.

Special Identifying Features

C. rugelia differs from the other southeastern Cacalia in its essentially rosulate habit, in being pubescent (the other Cacalia are smooth), in its larger, yet fewer, more floriferous, heads. As the synonymy indicates, it was once placed in Senecio, removed from it partly because of its atypical chromosome number, but certainly does not bear much resemblance to any southeastern Senecio either in leaf or in flower color.

Habitat and Management Implications

C. rugelia may locally form populations of thousands of individuals amongst granite boulders and on ledges, rooted in moist, highly acidic duff under spruce or fir toward or on summit elevations of some of the higher ridges in the Blue Ridge (Haywood, Swain, Macon counties in N.C., Sevier Co. in Tennessee). It is a shade plant, preferring a continuously cool, moist substratum, and would be damaged by any removal of the essentially coniferous overstory. Much of its territory lies within National Park or National Forest, but its choice of summit forest makes it susceptible to trampling by backpackers who travel the ridge trails. Irresponsible private or public development for recreational-vacational purposes of the high ridge country also poses a threat to this species. The plant is certainly rare enough in occurrence, and narrow enough in range to be monitored carefully in future.

References

- Barkley, T.M. and A. Cronquist. 1974. Cacalia rugelia, a new combination for a North American Senecionoid. Rhodora 76: 48-50.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1475-1480. Chapel Hill, N.C.

SPECIES Cacalia rugelia (Shuttlw. ex Chapm.) Barkley & Cronq.
Rugel's indian-plantain

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X					X		
Damage		NA	NA	NA	X		NA	
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Cacalia rugelia (Shuttlw. ex Chapm.)
Barkley & Cronquist



ASTERACEAE

Coreopsis latifolia Michx. broad-leaved tickseed

Technical Description

Perennial herbs from short, knotty rhizomes.

Stems.-- Erect or ascending, solitary or clumped, the stem bases often decumbent and rooting from lowermost nodes, upwardly abruptly bent, erect or nearly so, to 1.5 meters tall, smooth, green, terete, low-ribbed, the ribs pale green, most prominent distally, the axis usually unbranched below the inflorescence.

Leaves.-- Mostly opposite, ascending or spreading, on petioles 1-3 cm long, the blades thin, mainly broadly lanceolate to ovate, the lowermost absent by flowering time, the largest generally about mid-stem, 10-20 cm long, 5-10 cm broad, acuminate, coarsely serrate or serrate-dentate, the teeth-tips apiculate, the blade bases cuneate to attenuate, usually entire, the upper surface a deep yellow-green, smooth, the lower surface markedly paler, smooth to sparsely soft-puberulent; blades abruptly or gradually diminishing in size into the inflorescence, there mostly lanceolate, lower-toothed, remaining petiolate.

Inflorescence.-- A few-to-many-headed, rather open but narrowish cyme, the primary branches with long, naked bases, arching stiffly upward, the ultimate branches (peduncles) usually villosulous, generally longer than the heads subtended, subtended by or bearing narrowly elliptic or short-linear bracts.

Heads.-- At anthesis ca. 1 cm high, campanulate, the receptacle low-convex, the bracts in 2 series, the outer ones 5, spreading ascending or reflexed, linear-spatulate or oblong-linear, green, blunt-tipped, smooth, mostly 5-10 mm long, the inner series erect, broadly oblong, apically obtuse angled, also ciliate, to 1 cm long, firm-chaffy, enlarging with age, the margin pale, scarious, the surfaces at anthesis yellow-green, smooth, narrowly ribbed longitudinally with reddish resin vesicles; pales (chaff) about the length of the inner cracks, similar in texture and veining, but grading narrower inward on receptacle, the scarious margins sparsely ciliate.

Florets.-- Ray florets 4-5, sterile, the corollas yellow, the tubular base sparsely villous, the ligules spreading, broadly oblong-elliptic, mostly 1.5-2.0 cm long, clear yellow, the parallel veining narrow, orange; disc florets many, dull yellow-green or orangish, the base greenish, ca. 1.5 cm long, expanding to a cylindrical throat ca. 5 mm long, the 5 triangular lobes at anthesis slightly spreading, ca. 1.5 long; anther tube at anthesis long-exsert, dark purple-brown; stigma apices yellow, narrowly conic-subulate.

Fruit.-- Akene oblong-elliptic, dorsiventrally flattened (flattened parallel to the bracts), mostly 7-9 mm long (frequently ranging in length in the same head!), 2-edged and medially ribbed, occasionally with 1-2 additional ribs, dark brown, smooth, the pappus obsolete.

Distribution and Flowering Season

Rich, hardwood forested mountain coves and slopes, Blue Ridge, western North Carolina southward into South Carolina and northeastern Georgia; very local;

flowering from September to frost.

Special Identifying Features

This species looks more like a Helianthus or Heliopsis at first glance than it does a Coreopsis. In fact, it is invariably associated with species in both these genera, particularly Helianthus decapetalus, H. divaricatus, and Heliopsis helianthoides. Of course, its double and dimorphic bract series with inner bracts not overlapping and its flattened fruit help to distinguish it at close range. Within the opposite-leaved Coreopsis there is nothing else like it, particularly in leaf, in that all the other species have leaf or leaflet blades entire, usually much firmer, certainly smaller. C. latifolia has another peculiar quirk in that usually all of its rays do not develop equally, this giving a "lopsided" aspect to the heads at anthesis.

Habitat and Management Implications

C. latifolia is a species of rich, moist, deep, well-drained, shaded sandy loams such as are found in the Blue Ridge mountain coves; I have not seen it above altitudes of 4,000 ft. It is invariably in or at the edges of open or dense forest, this mostly hardwoods such as Liriodendron, Aesculus octandra, Tilia, Quercus rubra, Q. alba, Acer saccharum, A. rubrum, Betula lenta, etc., sometimes with White pine, Hemlock. The understory is mostly Cornus florida, Rhododendron, Clethra, Viburnum, Sambucus and the herbaceous associates are those common to rich Southern Appalachian coves, in late summer and fall being mostly various Eupatoria (mainly E. rugosum, E. sessilifolium), Aster, Solidago (particularly S. caesia, S. curtissii, S. arguta) Elephantopus, Helianthus, Verbesina, Heliopsis, many ferns, Cimicifuga, Actaea alba, Campanula americana, Pycnanthemum (particularly P. montanum, P. pycnanthemoides), Monarda, (didyma, fistulosa, clinopodia), Physostegia, Stachys, Agastache, Muhlenbergia, Chasmanthium, Panicum, etc. The site, while rich, is often rocky, the deep soil around or pocketed in a jumble of acidic rock, this from upslope and frequently overlying basic rock. In that C. latifolia is a shade plant or at best an edge plant, it is supposed that such a plant would not succeed or compete well in clearcut areas, though the precise reasons for this are not known. Clear-cutting, attempted in steep areas such as these, would likely have a disastrous effect in admitting too much light and along with it, weedy herbs and woody plants (such as Lonicera, Rubus, Smilax, Pueraria) which would put stress on this species: erosion and drying out of the substrate would also occur. On the other hand, selection or group selection would probably have no lasting effect, were this done with minimum impact to the soil.

References

- Radford, A.E., H.E. Ahles, and C.R. Bell. 1968. Manual of the vascular flora of the Carolinas, pp. 1120-1125. Chapel Hill, N.C.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1446-1450. Chapel Hill, N.C.
- Smith, E.B. 1976. A biosystematic study of Coreopsis in eastern United States and Canada. Sida 6 (3): 123-215.

SPECIES Coreopsis latifolia Michx. Broad-leaved tickseed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	X	X	X		X		X
Damage								
No Lasting Effect					X			
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Coreopsis latifolia Michx.



ASTERACEAE

Helianthus debilis Nutt. ssp. vestitus (Wats.) Heller. hairy
cucumber-leaf sunflower
H. vestitus Wats.

Technical Description

Low, coarse, annual sunflower from a diffuse root, forming circular mats of procumbent or decumbent shoots that sometimes root at lower nodes.

Stems.-- Mostly 5-8 dm long, terete and ridged, much branched to form mats or trailing with only the tips ascending, the bases dull gray-brown, roughened and relieved by the white, persistent strumose bases of hairs, distally pale yellow-green, whitened by moderate to heavy white-villous, strumose (thickened-based) pubescence.

Leaves.-- Alternate and opposite on same shoot, spreading or ascending on slender, strumose-hirsute petioles 2-4 cm long, the blades somewhat fleshy, essentially triangular, toward the acute apex entire, the mid and lower margin coarsely, saliently and irregularly toothed, the base truncate to broadly cordate or auriculate, slightly attenuated to the petiole, the surfaces equally yellow-green, strigose or hispidulous-scabrid.

Inflorescence.-- Heads solitary from leaf axils toward tips of shoots on stiffly upwardly arching, hispid-hirsute peduncles at first shorter than leaves, later elongating to become 7-20 cm long; head diameter at full anthesis (across the rays) mostly 5-6 cm; involucre and disc at anthesis hemispheric, ca. 2 cm broad, from base to convex tip of disc ca. 1.5 cm; phyllaries in several series, coarsely herbaceous, loosely imbricated, green, narrowly lance-triangular, the longest 1.0-1.5 cm long, spreading or even recurved toward the slender tips, the margins coarsely scabrid-ciliate, the backs ribbed, granular and scaberulous; phyllaries abruptly grading to chaffy pales, these firm, folded, boat shaped, oblong, the body 5-7 mm long, the outer ones obtuse, truncate, or trilobate apically, those upward in head with tips scabridulous, tridentate, the central tooth subulate, or simply subulate, this imparting a somewhat bristly look to the disc in fruit; ray florets at least 10, often 12-14, sterile, the short, tubular base erect, the ligule bright yellow, spreading, elliptical, 2.5-3.0 cm long; disc purplish-brown, the corolla symmetrical, erect, 4-5 mm long, the pale tube base inverted cupuliform, hirtellous, joined by a constriction to the swollen base of the upper tube, this cylindrical, reddish-purple, externally granular, terminating in 5, triangular-spreading-ascending, purplish lobes, these with backs scaberulous; style branches 2, the purplish, hispidulous stigma tips spreading, exerted beyond the corolla at full anthesis.

Fruit.-- Akene oblong, quadrangular, 3.5-4.0 mm long, dark gray, the faces pale-hirtellous, pariticularly toward the truncate summit, the pappus obsolete.

Distribution and Flowering Time

Sandy clearings in coastal hammock, dunes along the coast, beaches, southwestern peninsular Florida; flowering all year.

Special Identifying Features

Only two decumbent, petiolate-leaved, dark-disced sunflowers inhabit the sandy coasts of peninsular Florida; the one on the east coast is ssp. debilis and from a distance it appears identical. However, a close look shows that the east coast subspecies lacks the shaggy white pubescence that marks so well the west coast subspecies, and its leaf margins are not as coarsely toothed.

Habitat and Management Implications

As mentioned above, ssp. vestitus forms mats on deep exposures of sand toward and along the Gulf coast of southern Peninsular Florida. Usually it is in full sun, but occasionally it moves inland to sandy clearings in open slash pine-saw palmetto or into coastal tropical hammock formations, so that it can be said to be forest related at least on a successional basis as a pioneer of disturbed sandy sites. Its usual associates are those typical of sea coasts, i.e. Panicum amarum, P. amarulum, Uniola paniculata, various Cenchrus, Aristida, Dichanthelium Panicum, Eragrostis oxylepis, various dry ground Cyperus, Opuntia, Scaevola, Ipomoea pes-caprae, I. sagittata, Phyllanthus amarus, Lippia, etc. This sort of habitat is maintained by development of sandy shorelines (particularly offshore bars) by offshore sea current combined with wind and wave action to form expanses of shifting sand, or by disturbance of coastal sandy hammock to provide same. These habitats are, over time, altered and the Helianthus suppressed, by invasion of stabilizing woody vegetation, in some cases pines such as P. elliotii, P. clausa, or by evergreen scrub hammock and always saw palmetto or Sabal. Originally the plants were probably more confined to the beaches but because of the bulldozer and other land-altering machines, now occurs at greater distances inland on disturbed sands. Most of the original shoreline habitat of ssp. vestitus has been destroyed by residential and recreational development of same.

References

- Heiser, C.B. et. al. 1969. The North American sunflowers (Helianthus).
Mem. Torr. Bot. Club 22 (3.): 1-218.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1431-1441.

SPECIES *Helianthus debilis* Nutt. ssp. *vestitus* (Wats.) Heller
Hairy cucumber-leaf sunflower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X					X	
Damage			N A	NA				X
No Lasting Effect								
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Helianthus debilis Nutt. ssp. vestitus (Wats.) Heller



ASTERACEAE

Helianthus schweinitzii T. & G. Schweinitz's sunflower

Technical Description

Perennial sunflower from a fascicle of slenderly carrot-like tuberous roots. Stems.-- Erect, solitary or few, terete and multistriate-ribbed, proximally nearly smooth and a dull brown or pale dull green, at very base 5-8 mm thick, distally becoming increasingly antrorsely strigillose, reddish, simple and leafless below by anthesis, branching only at or above mid-stem, the branches upwardly arched, candelabra-like.

Leaves.-- Opposite, the largest at about midstem (grading gradually below, where early deciduous, and above to widely scattered rameal pairs) spreading-ascending on short, strigose, clasping-based petioles 5 mm long or less, the blades narrowly lanceolate up to 14 cm long and 2 cm wide, narrowly acute, the margins somewhat revolute, entire or distantly very low serrate, the base cuneate or attenuate, the upper surface deep yellow-green, triple nerved, harsh, the lower surface strigose-tomentose with white hairs, thus paler, the midrib and laterals strongly raised.

Inflorescence.-- Heads several to many in a rather open system of upwardly arching, sparingly leafy-bracted primary peduncles these terminating in a single head or branching again in a cymose pattern, the ultimate peduncles varying in length from very elongate to a few times longer than the heads subtended; head diameter across the rays mostly ca. 4 cm, the involucre and disc at anthesis broadly campanulate, ca. 2 cm broad, 1.0-1.5 cm high from base to tip of convex disc; receptacle convex, chaffy; phyllaries very firm, green, herbaceous, in several loosely imbricate series, spreading-erect, ovate-lanceolate to narrowly lanceolate, narrowly acute or long-acuminate, the larger ones ca. 1 cm long, the margins harsh, the upper surfaces scabrid, the backs strigose-tomentose; phyllaries grading rather abruptly to oblong, keeled, apically tridentate, firm chaff 5-8 mm long, the apex hirsute-ciliate, the backs strongly multiribbed, yellow-green, smooth save for a green and white-pubescent midrib; ray florets 8-10, sterile, the ligules elliptic-oblong, ca. 2.0-2.5 cm long, spreading, light yellow, puberulent; disc corollas ca. 5 mm high, tubular, constricted just above the inverted, pale, discoid base, the limb broadly tubular, greenish-yellow, the 5 erect or slightly spreading yellowish lobes triangular, ca. 1 mm long, the spreading, linear, tapering, hispidulous stigmatic branches barely exerted at anthesis. Fruit.-- Akenes in outline oblong, somewhat widened upward, dorsiventrally somewhat flattened (in plane parallel with phyllaries), ca. 5 mm long, dark gray-brown, distally strigillose; pappus of 2-4, early deciduous, scarious, narrowly lanceolate or triangular scales.

Distribution and Flowering Time

Clearings in and edges of upland woods, local in the Piedmont of North and South Carolina, very rare in the Coastal Plain of the Carolinas; flowering from September to frost.

Special Identifying Features

This sunflower, save for its unique, fascicled-tuberous, roots most resembles, in its small, yellow-flowered heads, sympatric populations of H. laevigatus T. & G. and narrow-leaved extremes of H. microcephalus T. & G. However it differs from both these last in its harsh upper stems.

Habitat and Management Implications

H. schweinitzii prefers moist to dryish clays, clay-loams or sandy clay loams, these often with a high gravel content and all moderately podzolized. It is a plant of full sun or the light shade of open stands of oak-pine-hickory, the oaks being primarily upland species such as Q. montana, Q. coccinea, Q. velutina, Q. marilandica, Q. stellata, etc. the pines mainly P. virginiana, P. taeda, P. echinata, P. palustris (this last in the Coastal Plain sites), the hickories mostly Carya glabra, C. tomentosa, C. pallida. The clearings and "edges" this sunflower frequents support a wide upland grass flora composed of general Andropogon, Aristida, Panicum, Gymnopogon, Danthonia, Stipa avenacea, Erianthus, Sorghastrum, etc. many legumes, particularly in Lespedeza, Desmodium and an abundance of composites in genera Heterotheca, Liatris, Solidago, Aster, Silphium. Patches of bracken fern are abundant, admixed with large clones of Vaccinium.

Woods fires are part of the history of the vegetation of this area; many of the herbs (including the Helianthus) are cormophytic and are sun plants, thus their abundance depending on a factor such as fire reduce the shade and competition of woody plants. The greatest risk faced by this local species is that of pine monoculture, in that the stands of planted pine when properly spaced for high production are too dense, admit too little light. Areas in which there has been mechanical site preparation to the point of bare mineral earth may be colonized readily by H. schweinitzii if a seed source of that species is conveniently nearby. The problem is that, this being a very localized species, and in that site prep areas are often so very large, such seed sources are usually themselves destroyed; therefore large tracts of the former range of H. schweinitzii now lack it.

References

- Heiser, C. B. et al 1969. The North American sunflowers (Helianthus). Mem. Torr. Bot. Club 22 (3): 1-218.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1431-1441. Chapel Hill.

SPECIES Helianthus schweinitzii T. & G. Schweinitz's sunflower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Note remark about problems with site preparation!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Helianthus schweinitzii T. & G.



ASTERACEAE

Liatris helleri T. C. Porter. Heller's gay-feather
Laciniaria helleri (Porter) Porter

Technical Description

Smoothish perennials from depressed-globose cormose rootstocks 2-5 cm broad. Stems.--Stiffly erect, 1-several, arising from a short crown tufted with basal leaves plus fibrous-shreddy remains of old leaf bases, to 4 dm high but usually lower, proximally purplish, distally green, strongly ribbed, angulate.

Leaves.-- Both basal and cauline, numerous, those at stem base and on short offshoots longest, often 2-3 dm long, the flat blades linear-oblongate, elliptic-linear or linear, acute, entire, tapering gradually to slender, erect, ribbed petioles, the surfaces scatteringly punctate, equally pale green, only the midrib prominent; leaves upward on stem erect, gradually reduced in their length and width, with the petioles shortening and winged, often sparsely ciliate, grading into linear bracteal leaves of the inflorescence.

Inflorescence.-- Heads somewhat scattered to approximate, axillary singly to lineal bracts, sessile or nearly so in an elongate, showy, narrow determinate spike or spikelike raceme 7-20 cm long, individually campanulate, from base to tip of florets 1.0-1.3 cm long; receptacle naked, somewhat elevated; involucre bracts thinnish, imbricated in several series, the largest ones inner or medial, ca. 7-8 mm long, oblong or obovate, apically rounded, marginally ciliate, the backs slightly rounded, longitudinally ribbed, green proximally, maroon distally and with a broadish, scarious, rosy border; all flowers discoid, symmetrical, perfect, 7-10/head, corolla pale to deep lavender rose, from tube base to orifice ca. 5 mm long, the tube scattered-pilose within, the lobes narrowly triangular, spreading, 2.0-2.5 mm long, the 2 stigma lobes long-linear, terete, well exerted and spreading, deep lavender-rose, papillose.

Fruit.-- Akene narrowly cuneiform, strongly angled and ribbed, ca. 5 mm long, the intervals shallowly to deeply concave, the surface nearly black, hispidulous along the ribs; pappus of numerous, rigidly erect, slender, pale purple, antrorsely barbed, bristles, these extending only 1/2-2/3 way to corolla throat.

Distribution and Flowering Season

On and around outcrops of granitic rock, very local, northern Blue Ridge of North Carolina; flowering from July through September.

Special Identifying Features

L. helleri in general appearance is most like high altitude races of L. spicata (var. typica, forma montana fide Gaiser, 1946) differing primarily in its internally pilose (rather than smooth) corolla tube, and its ciliate (versus entire) petioles. Within its own complex, which has corolla tubes

hairy within, it is nearest L. graminifolia, differing (dubiously) from it primarily by its much shorter pappus (which in L. graminifolia extends nearly to the disc corolla apex), and lower, stockier habit.

Habitat and Management Implications

L. helleri is found on the shallow, acid soils of ledges in outcrops of granitic rock in a few, scattered sumits of the Northern Blue Ridge in North Carolina. It is a plant of full sun, usually found mixed with mountain grasses, sedges and composites in shallow depressions in the outcrops or right around them. Other common associates are Selaginella tortipila, Arenaria groenlandica, Paronychia argyrocoma, Sedum telephoides, Potentilla Saxifraga michauxii, Heuchera villosa, etc. Depending on elevation the succession is toward yellow pine-hardwood (at lower summits), spruce-fire (at higher elevations), but this is a slow process. Greatest damage to the plants has actually come from commercial, recreational and/or residential development of some of the open summit country, as has been the case on Blowing Rock and Grandfather Mountain. Open areas where these plants grow should probably be fenced off to avoid needless trampling by hikers, though there would still be the question of enforcement. Since these plants are confined to outcrops or their environs, where the soil is very thin, such trees as do provide a little shade are of a poor quality, and the sites generally are unsuitable for managed forest.

References

Gaiser, L. O. 1946. The genus Liatris Rhodora 48: (nos. 572-576).

Small, J. K. 1933. Manual of the southeastern flora, pp. 1331-1335. Chapel Hill.

SPECIES Liatris helleri T. C. Porter. Heller's gay-feather

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			NA	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Liatris helleri T. C. Porter



ASTERACEAE

Rudbeckia triloba L. var. pinnatifida T. & G. pinnate-lobed black-eyed
susan
R. pinnatifida (T. & G.) Beadle

Technical Description

Taprooted, annual herbs.

Stems.-- Erect or ascending, to 1 meter tall but usually lower, terete, simple below the inflorescence or prolifically branched with branches ascending, terete, strongly reddish-purple-tinged, multiribbed often with heavy spreading or retrorse shaggy pilosity at least on the lowermost nodes and internodes, at mid-stem and above softly hirsute and/or strigillose.

Leaves.-- Rosette leaves usually withered by flowering time, spreading, to 1 dm long, pinnately lobed, the few segments spreading or ascending, mostly oblong or lanceolate, pale yellow green, hirsute; stem leaves alternate, spreading, the lower ones similar to rosette leaves and strongly petiolate, then progressively smaller upward on stem, becoming sessile, elliptic or elliptic linear, acutish, entire or serrate, the bases cuneate, the surfaces pale yellow-green, beneath both hirsute and hirtellous, above hirsute and hispid-hirsute.

Inflorescence.-- Heads several to very many (depending on luxuriance of plants) usually one or few, strongly pedunculate on the arching-spreading-ascending, stiffish inflorescence branches, thus the heads in broad or narrowish panicles. Receptacle of head conic, 1.0-1.5 cm broad on a strigose peduncle longer than the head; involucral bracts green stiffly spreading, broadly linear or narrowly triangular or lanceolate, 0.7-1.0 cm long, acute, entire, strigillose or even with bases beneath shaggy-hirsute with pale hairs; chaff stiff, translucent, oblanceolate, strongly subulate-tipped, these tips dark purplish-maroon, the body bearing submarginally on each side a strong maroon or purple band.

Flowers.-- Ray florets sterile, mostly 8-10, the ligules above the short corolla tube flat, spreading, elliptic or oblong-elliptic, mostly 1.0-1.5 cm long, a rich orange-yellow, papillose; disc florets very many, shorter than the bristly tips of the chaff, tubular, ca. 3 mm long, the pale tube dilating gradually into the throat, the throat and the 5 erect, triangular lobes deep maroon; stigma tips blunt, covered with clavate, purplish-brown trichomes.

Fruit.-- Akene broadly wedge-shaped, quadrate, ca. 2 mm long, deep reddish-brown, smooth, the truncate apex with pappus a low, short-lacerate crown, this producing a short cusp at each of the 4 angles.

Distribution and Flowering Season

Thin soils over calcareous rock, glades, clearings, open calcareous woodlands, very local but locally abundant, northwestern Florida, inner Coastal Plain Alabama and western North Carolina; flowering from late July to frost.

Special Identifying Features

The species R. triloba is distinguished from other sympatric Rudbeckia by its

annual character combined with short, blunt style tips and subulate chaff-tips. The variety is distinguished by its 5-7-lobed pinnation of its rosette and lower stem leaves and to a lesser degree by the pale, dense, usually spreading or somewhat reflexed pubescence of the lower stem (this last not a constant character!).

Habitat and Management Implications

Rudbeckia triloba pinnatiloba prefers basic soils, these usually shallow, dryish, well-drained, derived from chalks, marls, limestones, and usually sunny. Thus, it is generally found in open woodlands or in small natural or artificial clearings. The surrounding forest is often a mixture of Juniperus, calciphilic oaks such as Quercus shumardii, Q. muhlenbergii, Q. durandi, etc. Ulmus americana, U. rubra, U. alata, Bumelia, Rhus (particularly R. aromatica), Rhamnus, Cercis, Carya ovata, C. carolinae-septentrionalis, etc. In the clearings it is often associated with Thaspium pinnatifidum, Zizia, Delphinium carolinianum, Lithospermum canescens, L. tuberosum, Phlox pilosa, various Sporobolus, Panicum, Melica, Bromus, Elymus. In the open woodlands it is with such spring woodland herbs as Sanguinaria, Hepatica, Polymnia, (in Florida this is P. laevigata) Aquilegia, Sedum (in Alabama this may be S. nevii), Arenaria lanuginosa, Euphorbia commutata, various sessile-flowered Trillium, etc. The sites, being thin soils over limestone and often very rocky, produce some, but not much quality, oak, hickory, juniper. They are definitely unsuitable for plantation forestry or for mechanical site preparation methods. Since the Rudbeckia is on thin soils or on and around rock outcrops and in clearings where there is often a good exposure of mineral earth it would follow that admitting more light through removal of timber and competing understory woody growth would not harm, and probably would promote an increase of, this plant (frequently it escapes to road shoulders where the road building exposes calcareous ground!).

References

- Beadle, C.D. 1898. Notes on the botany of the southeastern states. Bot. Gaz. 25: 276-280.
- Perdue, R.E. 1957. Synopsis of Rudbeckia subgenus Rudbeckia. Rhodora 59 (708): 294-299.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1422-1427. Chapel Hill, N.C.
- Torrey, J. and A. Gray. 1842. Rudbeckia in North American Flora 2: 308.

SPECIES Rudbeckia triloba L. var. pinnatiloba T. & G.
Pinnate-lobed black-eyed susan

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			NA	
Damage								X
No Lasting Effect	X							
Beneficial if Done Properly					X	X		

Other Comments: This plant locally is as much of a weed as
the common variety!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Rudbeckia triloba L. var. pinnatifida T. & G.



ASTERACEAE

Senecio millefolium T. & G. Piedmont ragwort
S. memmingeri Britt.

Technical Description

Solitary or caespitose, rosulate and caulescent perennial, from a stout cardex, increasing by ascending, short-rhizomatous, offshoots.

Stems.-- Ascending to erect, fistulose, mostly 5-8 dm high, proximally and on the nodes white-wooly-hairy, strongly ribbed, often sulcate, branching from the middle or above, the slender branches arching upward, terminating in inflorescence branchlets.

Leaves.-- Rosette leaves numerous, spreading to erect, these and the lower stem leaves crowded, mostly 1-3 dm long, strongly petiolate, the slender petiole bases abruptly and broadly clasping, the blades smooth, mostly oblong or cuneate or narrowly obovoid, 1-3 cm long, divided into few to many, short-to-elongate-linear segments, in all giving a "parsley" aspect to the foliage; stem leaves alternate, becoming more scattered, shorter, more sessile, and generally less dissected upward on stem, grading into scattered, short-linear-triangular bracteal leaves in the inflorescence.

Inflorescence.-- A single or compound system of cymes, the primary and lower branches upcurved, variously elongate, the ultimate, crowded peduncles of various lengths but usually much longer than heads, very slender, smooth, each branchlet subtended by a short-linear-triangular villosulous bract and with few to many bractlets, some usually directly subtending the head; heads campanulate, ca. 1 cm high, the receptacle shallowly convex, chaffless; phyllaries usually in 2 series, the outer irregular, of a very few short, linear-triangular, erect or incurved bractlets mostly 1 mm long or less, or these lacking, the inner series of very many narrowly linear-triangular, subequal, thin, green phyllaries, these ca. 5-8 mm long, fused below the middle into a cup, their suberect tips triangular, acute, with broad, pale, scarious margins.

Flowers.-- Of two sorts, ray and disc, the former pistillate, the latter perfect; ray florets ca. 10, the ligules spreading, 5-9 mm long, linear-elliptic, bright yellow, apically 3-5-toothed; disc florets with corolla ca. 4 mm high, erect, deeper yellow, the slender tube broadening into a narrowly campanulate throat, the 5 erect to spreading lobes short-triangular.

Fruit.-- Akenes linear-ellipsoidal, ca. 2.5 mm long, 5-ribbed, the ribs strongly raised, densely short-hairy with pale hairs, the intervals pale to dark brown; pappus white, of very many distinct, capillary bristles.

Distribution and Flowering Season

Open to lightly shaded granitic outcrops, Blue Ridge and inner Piedmont, North Carolina southward into northeastern Georgia and northwestern South Carolina. Flowering in May.

Special Identifying Features

S. millefolium is taxonomically closest to S. anonymus Wood (S. smallii Britt.) and intergrades with it in some localities. The only real difference between the two appears to be the much more dissected foliage of the former. Intergrades, or somewhat more dissected-leaved S. anonymus may account for S. memmingeri and a range of S. millefolium extended to northeastern Alabama by some authors. However, the real S. millefolium, whatever its true biological status, appears to be found only in the Blue Ridge and upper Piedmont of three states.

Habitat and Management Implications

S. millefolium grows on thin soils over granitic rock, usually on and around outcrops. Usually it is in full sun on steep granite domes or ledges, in shallow depressions or cracks therein, but occasionally may be found in light shade of an oak-hickory-pine-juniper overstory. The soil is prevalently sandy, acid and poor, and some associated herbaceous plants are in genera Danthonia, Panicum, Aristida, Bulbostylis, Carex (such as C. nigromarginata, C. physorhyncha), Arenaria, Sedum, Thermopsis, Baptisia, various dry site Solidago, Aster, Coreopsis. Elevations range from 2,000 ft. to 4,000 ft. In the vicinity of Caesar's Head, S.C. are seen several small populations, many in the process of being shaded out by encroaching woody vegetation, evidence that this plant occupies a niche below climax. It is endangered over its small range primarily by development of the rocky and scenic land for vacation or retirement housing.

References

- Barkley, T.M. 1978. Senecio in North American Flora, Ser. II (10): 50-139. New York Botanical Garden.
- Radford, A.E., C.R. Bell and H. Ahles. 1968. Manual of the vascular flora of the Carolinas, pp. 1034-1037. Chapel Hill, N.C.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1478-1480. Chapel Hill, N.C.
- Torrey, John and Asa Gray. 1843. Flora of North America 2: 444.

SPECIES Senecio millefolium T. & G. Piedmont ragwort

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			NA	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Senecio millefolium T. & G.



ASTERACEAE

Solidago spithamea Curtis Blue Ridge goldenrod

Technical Description

Stocky perennial goldenrod from a stoutish, erect, or ascending rhizome, this cloaked above by the brown bases of old leaves, often 1 cm thick.

Stems.-- Solitary or in small tufts, erect or nearly so, slender but stiffish, very leafy and compact, 1-2 (-3) dm tall, terete and longitudinally striate, greenish - brown proximally, distally becoming more strongly ribbed and reddish, sparsely to moderately strigillose, or strigose-tomentose with whitish hairs, usually simple below the inflorescence.

Leaves.-- Smooth, the offshoot and basal cauline leaves the largest and longest, ascending or erect, mostly 8-15 cm long, oblanceolate or spatulate, acute, the broader portions coarsely ascending-serrate, to 3 cm wide, the bases long-attenuate, providing a wing to the clasping petiole, the upper surface deep yellow green, inconspicuously reticulate, the lower surface paler, finely but conspicuously reticulate; cauline leaves gradually reduced upward into the inflorescence, ascending to spreading, approximate, progressively more sessile.

Inflorescence.-- A compact, symmetrical, broader than long, convex, terminal grouping of stiffly ascending, leafy-bracted cymes, 3-10 cm broad; heads campanulate, at full anthesis 7-9 mm high from base to tip of florets, 6-7 mm wide across the pappus tips; receptacle slightly elevated, chaffless; phyllaries rather tightly imbricated in several series, erect, ca. 5 mm long, lance-linear, acute to acuminate, ciliolate, the bases outbowed, white chartaceous, the surface toward the tip smooth, green, the apparent venation consisting of a single strong midrib; ray florets pistillate, 8-10 (some transitional to disc), the corollas with ligules spreading clear yellow, to 3 mm long, from narrowly elliptic to broadly cuneate-obovate, apically rounded bi-or-trilobate; disc florets numerous, erect, perfect, regular, the corolla ca. 4 mm long, the tube slender, abruptly broadening to a cylindroc campanulate throat and 5 triangular, spreading lobes ca. 1 mm long; style branches erect or spreading, lance-linear, flattened ventrally, well exerted beyond the corolla at anthesis.

Fruit.-- Akene columnar, 3.5-4.0 mm long, strigillose, pale brown; pappus ca. 3.5 mm long, of numerous, white, antrorsely barbellate capillary bristles.

Distribution and Flowering Season

Rock outcrops, ledges, balds at high elevations, Blue Ridge, North Carolina and Tennessee; flowering from late July to September.

Special Identifying Features

This goldenrod is distinguished from the other cymose-corymbose southeastern species by its low stature, smoothish foliage, toothier non-clasping (in comparison with S. rigida, a tall plant essentially of prairie - savanna) stem leaves.

Habitat and Management Implications

S. spithamea is indeed a rare plant, being confined to a few rocky, granitic summits in the Blue Ridge, not being known from elevations under 4,000 ft. Typically it is rooted shallowly in dark humified fine sands that accumulate in cracks or pockets on acid rock, or on bluff ledges, usually in full sun. Sometimes it is with grasses and sedges on the grass balds contiguous to rock outcrops. Common associate herbs are plants such as Deschampsia flexuosa, Danthonia compressa, Poa spp., many high bald Carex, Potentilla tridentata, Prenanthes roanensis, Arenaria groenlandica, Paronychia argyrocoma, Hedyotis montana, Geum radiatum, etc. Thus it is basically a grass bald species, in a rare and sensitive system that contains many other rare species of herbs. Two risks to it are posed. The first is natural succession, in that shrubby ericads gradually invade balds, finally suppressing most herbs, then these heaths later are overgrown by Picea or Abies. This natural succession is very slow, is comparable to that taking place on granitic rock in the boreal forest formations to the north. The second is the impact of humans on the site; high Blue Ridge balds are extremely scenic, of great interest to tourists and local recreators and thus National Forest, National and State Park, and private developers alike wish to provide road access to some of the most scenic places. This means (in the case of Grandfather Mountain, Roan Mountain, Banner Elk, etc.) development of parking, lodge, or shelter facilities at the summits and thus the habitat for the goldenrod and other rarities is reduced. Excessive trail building and road construction to overlooks have taken their toll, either through the actual construction process or by trampling later by sightseers. In that most of the known habitat for S. spithamea is "protected" either by public or private ownership, and in that the philosophy of all at present is away from the logging of summit forest, forest practices pose no threat to this species.

References

- Radford, A.E., C.R. Bell and H.E. Ahles. 1968. Manual of the vascular flora of the Carolinas, pp. 1084-1098. Chapel Hill, N.C.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1344-1360. Chapel Hill, N.C.

SPECIES Solidago spithamea Curtis. Blue Ridge goldenrod

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			NA	
Damage								X
No Lasting Effect	X							
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Solidago spithamea Curtis



BETULACEAE

Betula uber (Ashe) Fern. Virginia round-leaf birch
B. lenta L. var. ubber Ashe

Technical Description

Tree to ca. 30 feet tall and 12" d.b.h., the growth pleasingly aromatic, smelling of wintergreen the trunk erect to ascending, the bark dark reddish-brown, this, shallowly furrowed, cross-checking, forming thin, appressed scales, the branching profuse, spreading, pendulous toward tips, forming a roundish crown.

Twigs.-- Slender, zig-zag, dark red-brown or paler, with pale, somewhat raised lenticles, smooth; winter buds ovoid or lance-ovoid, acute, ca. 5-7 mm long, the numerous scales imbricate, the rounded backs reddish-brown, ciliate, somewhat resinous; spur shoots abundantly produced.

Leaves.-- Deciduous, alternate, stipulate, the stipules deciduous early, the petioles spreading, slender, 8-10 mm long, adaxially pilose, particularly near junction with blade; blades membranaceous, broadly ovate to suborbicular, 1.5-3.0 (-3.5) cm long, 1.5-2.5 cm wide, rounded, the margin serrate-dentate, the tooth tips sharp, the venation ascending-pinnate, with 4-5 pairs of laterals, the upper surface glabrous, dark green the lower surface appressed-pilose along the midrib and toward the base of larger lateral veins.

Inflorescence.-- Flowers unisexual, male and female catkins produced on same tree, the former preformed the previous year, narrowly cylindrical, elongating and drooping at anthesis, fully 8-10 cm long, the bracts reddish-brown essentially as in B. lenta, the female catkins mostly erect, single and terminal on the spur and short shoots of a season in late spring, ripening during summer and persisting through the season, ovoid-cylindric, 1.4-1.8 cm long.

Flowers.-- Male flowers not seen; female flowers "naked", 2-styled in axils of numerous, imbricated, 3-lobed bracts, these with lobes subequal, broadened distally, the central one erect, the laterals bowed outward, all raised abaxially, veiny distally, the venation impressed adaxially along median and all somewhat glutinous.

Fruit.-- Akene ca. 2 mm long, 1.8-2.0 mm wide, the body elliptic or obovate, winged, the thin wing narrow toward the base, broadening distally and there 0.5 mm wide.

Distribution and Flowering Time

Gravelly banks and bottoms of Cressy Creek, at elevation of ca. 3800 ft., Blue Ridge, Western Virginia; flowering in late spring, fruit maturing in June and persisting through summer.

Special Identifying Features

This rare tree is in all ways similar to Black Birch except in its rounder, smaller, leaf blades which have less pairs of lateral veins, and in its more

pilose petioles. It does not really appear to act as a species and research is now being conducted to determine its true biological status. Its seed germination is poor, only about 1%. In an experiment where 300 seedlings were finally gotten only 3 were true to type, the rest exhibiting characters of B. lenta. However, of numerous attempts to graft stock, only two have succeeded thus far (Dr. Sharik, 1979).

Habitat and Management Implications

The round-leaved birch, as mentioned above, is known from only one locality. This is the rocky, gravelly bottom of Cressy Creek, a shallow, swift mountain stream south of Marion. The trees are genuinely rare with less than 50 plants known from the area, most of these seedlings, and most of the specimens on private land, only 14 large enough to produce fruit. Of these "mature" specimens only one is on Forest Service land. Betula lenta is abundant in the same area. Associate species of trees on the gravelly or sandy alluvium of the creek bottom include Acer saccharum, A. rubrum, Quercus rubra, Prunus serotina, P. americana, Platanus occidentalis, Robinia pseudoacacia, Fraxinus pensylvanica, with Ostrya virginiana, Carpinus caroliniana, Cornus florida, C. amomum, Alnus serrulata, Amelanchier laevis, Crataegus flabellata, C. crusgalli, Malus coronaria in the understory. Tsuga canadensis, Pinus strobus, P. echinata, and P. virginiana are scattered throughout or form small stands. Much of the bottom floods and much of the area along Cressy Creek has been cleared for pasture or is pastured woodland. The forest generally shows a history of logging and probably had been logged over by the time W.W. Ashe found the trees there in 1914. The birch appears to occupy (as does B. lenta) a disclimax role in forest succession. At present, in spite of (and perhaps because of) considerable effort on the part of conservationists, etc., communication is poor between the Government and the private land owners in the area, to the point where continued survival of the less than 50 individuals is uncertain. There has already been considerable abuse of the plants, not only by locals but also by professional people who should have known better. The single large tree that is on U.S. Forest land is now well protected by high wire fencing although (and this seems strange!) the site is marked by a roadside sign.

The future of the tree in cultivation appears to be assured, in that many cuttings have been rooted or will be rooted. But the future of this doubtful taxon in nature remains questionable.

References

- Ashe, W.W. 1918. Notes on Betula, Rhodora 20:64.
- Fernald, M.L. 1945. Notes on Betula in eastern North America, Rhodora 47: 325-326.
- Johnson, A.G. 1954. Betula lenta var. uber Ashe. Rhodora 56: 129-131.
- Ogle, D.W. and P.M. Mazzeo. 1976. Betula uber, the Virginia round leaf birch, rediscovered in southwestern Virginia, Castanea 41: 248-256.
- Reed, C.F. 1975. Betula uber (Ashe) Fernald rediscovered in Virginia. Phytologia 32 (4): 305-311.

Sharik, T. 1979. The endangered Virginia round-leaf birch (Betula Uber (Ashe) Fernald): an example of the challenges in the management of rare and local tree populations. Paper presented in the Conference at V.P.I. "Dendrology in the Eastern Deciduous Forest Biome", 11 September 1979, Blacksburg, Virginia.

SPECIES Betula uber (Ashe) Fernald. Virginia round-leaf birch

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	NA	NA			X	
Damage	X					X		X
No Lasting Effect					X			
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Betula uber (Ashe) Fern.



BORAGINACEAE

Onosmodium molle Michx. Soft-hairy false-gromwell

Technical Description

Taprooted perennial bolting from an overwintering rosette the second season.

Stems.--Solitary or clumped, 5-8 (-10) dm tall, terete, pale yellow-green, strigose and hirsute, stiffly erect or ascending, branching only from mid-stem or above, the branches stiffly ascending, then spreading distally.

Leaves.--Rosette and lower stem leaves mostly oblanceolate, often withering by anthesis, the largest 10-20 cm long, those upward on stem becoming much smaller, ascending, often overlapping, spirally arranged, oblong to elliptic or lance-ovate, acute, entire, very firm, the base sessile, rounded or broadly cuneate; leaf surfaces gray-green, the pinnate-arcuate venation strongly raised beneath, the upper surface pale tomentose with upwardly appressed hairs, also often pilose with longer, scattered hairs, the lower surface densely appressed-pale-tomentose, sometimes hirsute on the raised veins.

Inflorescence.--A compound of elongating (indeterminate), strongly bracteate, scorpioid racemes, the bracts grading evenly larger downward on branches to stem leaves, gradually smaller upward in the inflorescence, overlapping, with shape and pubescence similar to that of uppermost foliage leaves, the flowers single in bract axils on ascending, stiff, strigose and pale-tomentose pedicels shorter than the flowers.

Flowers.--Regular, perfect; sepals 5, joined at very base, the lobes erect, linear, ca. 5-7 mm long (lengthened in fruit), green, but paler because of silvery strigose tomentum; petals 5, the gamopetalous corolla tubular-urceolate (narrowly urn-shaped), ca. 1 cm long, the tube gradually dilating to the throat, the 5 greenish, ovate-triangular, villosulous-backed lobes ca. 2.5 mm long, pointing inward around the exserted style, the whole corolla in outline oblanceolate and pale save toward the greenish tips; stamens 5, epipetalous, included in corolla, the anthers longer than the short filaments, oblong-linear, apiculate, basifixed, the filaments arising toward summit of corolla tube; ovary superior, 2-carpellate, deeply 4-lobed, the style strongly elongate, slender, erect, its tip projecting far beyond the corolla lobe tips.

Fruit.--Nutlets per flower 1-4, asymmetrically ovoid or ellipsoidal, 3.0-3.5 mm long, slightly narrowed below to a broad, concave, round basal attachment scar, the surface whitish to grayish or greenish-white, glassy, noticeably pitted.

Distribution and Flowering Season

Limestone glades, prairies, calcareous open woodlands, mostly of juniper, middle Kentucky southward through middle Tennessee into

The Highland Rim of northwestern Alabama; flowering in May and June.

Special Identifying Features

This species, while usually in pure populations within its rather narrow range, is sympatric with two others, namely Q. hispidissimum Mack. and Q. subsetosum Mack. & Bush. It differs from the former in its softer (to touch), denser leaf and bract tomentum, in its nutlet bases, which are far less narrowed. It differs from the latter in having a greener, hairier stem (Q. subsetosum has a yellowish, lustrous stem that toward its base is quite smooth). However, the outstanding difference is in the combination of the dense coating of appressed, pale, strigose but softish tomentum of its leaf and bract surfaces with the pale color of the tomentum which gives the plants even from a distance a distinctive pale green aspect.

Habitat and Management Implications

Q. molle is calciphilic, preferring the heavy clay soils derived from limestones and dolomites. It may be found in open stands of juniper, or juniper mixed with oak (mostly Quercus shumardii, Q. muhlenbergii, Q. stellata, Q. imbricaria), hickory (mostly Carya carolinae-septentrionalis, C. ovata, C. cordiformis), Ulmus (particularly U. serotina), white ash, blue ash, etc., and with an understory made up of Cercis, Cornus drummondii, Rhus (particularly R. aromatica), Bumelia lycioides, Rhamnus caroliniana, R. lanceolata, etc. In such sites however it can be seen that the Onosmodium is on its way out, being both shaded and crowded out by the woody plants. Its best habitat is in open limestone glades where it roots in the shallow heavy soils overlying the rock, or in depressions or cracks in the rock where some soil has accumulated. Common associated herbs are in the genera Opuntia, Sporobolus, Delphinium, Silphium, Petalostemon (particularly P. gattingeri in Tennessee!), Ratibida (pinnata), Lithospermum (canescens), Viola (often V. egglestonii), Psoralea (subacaulis), Leavenworthia, Senecio, Penstemon calycosus, Phlox (bifida), Verbena (canadensis, simplex), etc., in short, limestone glade herbs, many of which are narrow endemics. These open glades have been maintained historically primarily by natural fires accompanied by erosive forces that would tend to create openings. Such habitat, when left undisturbed, succeeds to junipers, then hardwoods, which ultimately crowd out or shade out the herbs. While the Onosmodium is a coarse herb not much taken by livestock, it vanishes from pastured glades, probably because of trampling by the stock. Removal of the juniper and hardwoods, if unaccompanied by radical soil disturbance, promotes increase of this species. The main threat to the existing

populations, most of which are found in middle Tennessee, comes mainly through the conversion of glades into industrial and residential developments.

References

Fernald, M. L. 1950. Gray's manual of botany, ed. 8, pp. 1200-1201. American Book Company.

Small, J. K. 1933. Manual of the southeastern flora, pp. 1126-1127. Chapel Hill, N.C.

Steyermark, J. A. 1963. Flora of Missouri, pp. 1244-1246. Ames, Ia.

SPECIES Onosmodium molle Michx. soft-hairy false-gromwell

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Onosmodium molle Michx.



BRASSICACEAE

Leavenworthia aurea Torr. Golden glade-cress

Technical Description

Glabrous, rosulate, taprooted winter annual.

Leaves.--Strictly basal, usually numerous, mostly 5-10 cm long, spreading, the slender, elongated petioles often purplish-tinged toward the abruptly dilated clasping base, the blades rather fleshy, either simple, broadly elliptical to ovate, suborbicular or reniform, or variously lyrate-pinnatifid, with the terminal segment similar to the simple blade, the lateral segments few to many, mainly broadly to narrowly triangular, often asymmetrical and often decurrent to form a variously broadened wing between segments; blade or segment margins entire to low-dentate or angulate; leaf surfaces pale green on both sides.

Inflorescence.--Scapes erect or spreading-ascending, terminating in a single flower or loosely racemose, in total length from 8-20 cm; raceme indeterminate, rarely compound, bractless, the slender ascending pedicels much elongating from bud to fruit.

Flowers.--Regular, bisexual, very sweetly fragrant, opening fully only on sunny days, closing at night or when shaded; sepals 4, distinct, cymbiform (boat-shaped), ca. 4 mm long, erect or ascending, pale yellow-orange, sometimes maroon-tinted toward base; petals 4, distinct, 7-8 (-10) mm long, the erect claw 2-3 mm long, the obtriangular, shallowly emarginate blade spreading-ascending, clear yellow, tinged with orange toward the base; stamens 6, distinct, erect, strongly tetradynamous (2 distinctly shorter), the longer ones ca. 5 mm long, the filaments strongly flattened, yellow, tapering into basifixed, introrse, ellipsoidal, yellowish anthers ca. 1 mm long; gynoecium at anthesis ca. 5 mm long, the narrowly ellipsoidal-cylindric ovary ca. 3 mm long, the style fleshy, the stigma narrowly discoid, papillose.

Fruit.--Siliques strongly flattened, parallel to a complete septum, oblong, 1.5-3.0 cm long (including style), ca. 5 mm wide, the margins straight or at intervals somewhat constricted, the persistent style ca. 3 mm long, the ripe valves straw-colored, raised-reticulate-veined. Seeds 5-11/fruit, strongly flattened, dark brown, ca. 4 mm wide, suborbicular, but truncated at the funicular end, otherwise narrowly winged with a wing ca. 0.5 mm broad.

Distribution and Flowering Season

Seasonally wet limestone glades, southeastern Oklahoma and eastern Texas (San Augustine Co.); flowering from late February into April.

Special Identifying Features

Leavenworthia aurea is taxonomically closest to L. exigua lutea, a resemblance strikingly apparent to any who have seen both in the field. Both have small yellow flowers, the petals of which are shallowly emarginate; both have flattened fruit and very similar foliage. The essential differences are that L. aurea has a somewhat thicker fruit with strong margins and a longer style, and terminal leaf segments that are more rounded, fleshier. L. aurea has a haploid chromosome number of 24; L. exigua lutea has $n = 11$.

Habitat and Management Implications

L. aurea is a typical open limestone glade plant, thus is part of an ecological system very similar to that occupied by most of the other species of Leavenworthia that range east of the Mississippi. It abounds locally on thin, clay or clay loam sites over flat-bedded limestone, usually in areas where shallow water flows or pools in winter and spring, but which tend to dry by late spring or summer. Nostoc balls are frequent over the surface of the substrate, and the associated genera (often species) are much the same as those of eastern Leavenworthia, namely Arenaria (mostly patula), Lesquerella, Talinum, Sedum (mostly S. pulchellum), Senecio, Delphinium (mostly D. virescens), Pentstemon, Satureia (mostly S. arkansana), Euphorbia, Scutellaria, Linum (frequently L. pratense), Verbena, Baptisia (mostly B. australis, B. sphaerocarpa), Nothoscordum, Allium, etc. Opuntia is common. Zygadenus nuttallii is frequent, as are Lindheimera texana, Stipa leucotricha. Isoetes butleri is frequent in the shallow pools, together with Callitriche, Gratiola, Lindernia. Succession is much the same as it is in eastern glades, early stages involving reproduction of Juniperus with a scattering of Ulmus (mostly U. crassifolia), Rhamnus, Forestiera, Quercus, Diospyros, etc. Ultimately the Juniperus gives way to the hardwoods which make up the climax forest. Historically such glades (as in Tennessee) were probably kept open through natural fires, periodic drought, which would reduce woody competitors and promote exposure of limestones by erosional forces.

L. aurea is primarily threatened by real estate development as the numerous towns within its range expand, by conversion of some of its area to "improved" pasture or to crop agriculture, both these latter activities usually involving alteration of the intermittent flow of water over the glades in winter or spring. Since the plants are sun plants, any land development that promotes successional direction toward forest will reduce their suitable area.

References

Rollins, R. C. 1963. The evolution and systematics of

Leavenworthia (Cruciferae). Contribs. Gray Herb. of Harvard
Univ. No. CXCII: 1-98.

Torrey, John. 1837. An account of several new genera and species
of North American plants. Ann. Lyc. Nat. Hist. 4: 80-94.

SPECIES Leavenworthia aurea Torr. golden glade-cress

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			X	
Damage								
No Lasting Effect								X
Beneficial if Done Properly	X				X	X		

Other Comments: drainage of the seasonally moist sites would be deleterious

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Leavenworthia aurea Torr.



BRASSICACEAE

Streptanthus squamiformis Goodman. Prairie twistflower

Technical Description

Taprooted annual herbs from winter rosettes.

Stems.--Erect, (0.1-) 0.5-1.0 (-3.0) meters tall, terete, smooth, pale green and slightly glaucous, toward base often purplish or reddish tinged, usually simple, sometimes sparingly ascending-branched.

Leaves.--Rosette leaves lyrate-pinnatifid, oblanceolate, to 2 dm long, long-petiolate; cauline leaves toward stem base similar in size and outline to those of rosette, but progressively shortening upward on stem, becoming auriculate-clasping, lanceolate, acute, entire; leaf surfaces smooth, pale green or tinged with red or maroon or purple.

Inflorescence.--An elongating (indeterminate), bractless raceme resembling that of Larkspur, in full flower erect, cylindrical, the pedicels in bud short, approximate, in full flower erect or strongly ascending, to ca. 1 cm, stiffish, though slender, hirsute with flattish, white trichomes, in fruit over 1 cm long and rather distant on the elongated raceme axis.

Flowers.--Perfect, regular, showy; calyx at anthesis cylindric-campanulate, fully 1 cm long, the 4 distinct sepals lance-oblong, strongly tinged with rose or purple, their narrowed tips spreading-recurved even in the bud, their backs rounded, strongly hirsute with flattened, white hairs, their margins broadly white-scarious; petals 4, fully 2 cm long, long-clawed, the claw ca. 1 cm long, erect, the blade broadly obovate, spreading, abruptly narrowed to and attenuated on the claw, the distal margin erose, surface purplish or lavender rose toward blade center, paler marginally; stamens 6, 2 shorter, the filaments erect, 7-8 mm long, pale yellow, the anthers lance-linear, ca. 3-4 mm long, deeply sagittate, purplish-blue, erect and basifixed, the apiculate tips excurved; ovary at anthesis superior, purplish, linear, shorter than the stamens.

Fruit.--Silicles ascending, mostly 8-15 cm long, linear, to 3 mm broad, flattened with the septum perpendicular to the plane of the valves; seeds up to 60, oblong, 3.0-3.3 mm long, narrowly winged.

Distribution and Flowering Season

Dry to moist uplands or ravine slopes in dense to open woodlands or in clearings, Ouachita Mountains of southeastern Oklahoma and southwestern Arkansas; flowering from late April through May.

Special Identifying Features

Streptanthus squamiformis is at once distinguished from other species of its geographical area by the copious pubescence of its pedicels and sepal backs, these hairs prominent, whitish, spreading and flattened (hence "squamiform"). The densely hirsute buds are broadly ovoid, with sepal tips prominently excurvate, this feature very noticeable in the field.

Habitat and Management Implications

This Streptanthus actually occurs in a wider variety of habitat than its describer indicated. It is abundant in open, sloping to quite steep, mesic though rocky, woodlands, there growing under a mixture of oaks, elms, maples and Juniperus, and associated with such spring woodland herbs as Hepatica, Dentaria, sessile Trillium, Sanguinaria, Senecio obovatus, Thaspium, Zizia, various violets including V. pennsylvanica, Dodecatheon, several carices including the endangered Carex latebracteata Waterfall, the local Valerianella palmeri, grasses such as Bromus purgans, Poa sylvestris, Festuca versuta, many Panicum. In such sites it may be rooted in deep, moist, well drained sandy loams or clay loams. It may also be found in open stands of upland oak-hickory-shortleaf pine, where the understory is primarily Cornus and Vaccinium, the herbaceous associates quite different, with more Phacelia, Phlox pilosa, Monarda russelliana, Silene virginica, Krigia, Oenothera, Valerianella longiflora, V. nuttallii, V. radiata, Antennaria, Tradescantia, Coreopsis, and various upland grasses and carices. Here the soil may be shallow or deep, a sandy loam or clay loam, frequently droughty. Still another sort of habitat may be completely open, often cliffs or ledges, outcrops of shale, novaculite or even calcareous rock, the plants rooted either in cracks or depressions in the more massive rock or directly in shaley talus or broken rock. Large plants are often found along new roads or in powerline clearings where there has been recent mechanical disturbance of the soil; similarly they often show up in areas that have been clearcut and site prepared either by burning or mechanical treatment or a combination of these. In nature the plants probably maintained either in outcrop areas or open barrens and probably (just as they do today!) acted as pioneers in areas where fire and/or slope erosion had occurred. One may visit sites in various stages of succession after fire and mechanical disturbance, and see how this Streptanthus is reduced in vigor and numbers over time. The species is definitely weedy, persisting in mesic sites where the steepness of the site allows erosional forces to create openings of mineral earth, persisting in open upland sites or in areas of talus, cliff or outcrop, invading freshly disturbed contiguous area.

Thus, clearcutting, burning, or mechanical site preparation pose no real threat providing contiguous area of seeding plants is available. The plants will not persist in pine plantations.

References

Goodman, G. J. 1956. A new species of Streptanthus. Rhodora 58: 354-355.

SPECIES Streptanthus squamiformis Goodman. Goodman's twistflower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy							X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X	X	X	X	X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Streptanthus squamiformis Goodman



BRASSICACEAE

Warea carteri Small. Carter's warea

Technical Description

Taprooted, glabrous, slender annuals mostly 2-10 dm high.

Stems.--Erect, terete, deep green tinted with red proximally, becoming pale green distally, simple or (more commonly) ascending-branched from mid-stem up to form an open, roundish crown.

Leaves.--Alternate, estipulate, simple, those of the lower stem absent by anthesis, the largest at flowering time lowermost on stem and branches, on slender, spreading petioles to 1 cm long, the blades mostly 2-5 cm long, narrowly elliptical to oblanceolate or spatulate, rounded, entire, the bases cuneate or attenuate, the surfaces pale yellow-green, inconspicuously reticulate, only the midrib prominent, the foliage gradually diminishing in size upward on stem, grading to scattered, lineal bracts.

Inflorescence.--An indeterminate, tiny-bracteate raceme, the flowers numerous, the spreading, filiform pedicels 5-10 mm long (lengthening somewhat in fruit), subtended by triangular, scalelike bracts ca. 1 mm long, the raceme outline broadly short ovoid-oblong to nearly round.

Flowers.--Perfect, somewhat zygomorphic; buds obovoid-pyriform, the sepals valvate; sepals 4, distinct, unequal, linear-oblanceolate or narrowly spatulate, 3-5 mm long, apically recurved, greenish-white; petals 4, spreading, distinct and distinctly unequal, the longest 8-9 mm long with more than half the length a slender, strongly tuberculate-papillose-based claw, the blade suborbicular, spatulate to obovate or reniform, erose-margined, white; stamens 6, erect to spreading, somewhat unequal, distinct, hypogynous, the slender white filaments to 6 mm long, the anthers basifixed, narrowly oblong, ca. 2 mm long, pale yellow; ovary superior, lineal, subterete, ca. 2 mm long, raised on a slender gynophore to 2 mm long, the strongly bilobed stigma sessile or nearly so.

Fruit.--Siliques on spreading pedicels to 1.5 cm long, continuous with straight slender gynophores 5-6 mm long, the fruit body lineal, spreading-recurved, 4-6 cm long, ca. 1 mm wide, slightly compressed laterally, the septum compressed parallel to the valves; seeds numerous, oblong, smooth, ca. 0.6 mm long.

Distribution and Flowering Season

Sandy clearings in sandscrub and sandhills, southern peninsular Florida; flowering all year, but particularly from late September through October.

Special Identifying Features

Warea carteri is one of four species endemic to the southeastern area. It is most similar to W. cuneifolia, differing in the stronger pubescence of its petal claws and in the consistently white corolla. It is also geographically distinct, being confined to southern Florida, while W. cuneifolia ranges from northern Florida northward in sandhills to the Carolinas. The only species with which W. carteri might be sympatric is W. amplexifolia (Nutt.) Nutt., a consistently ovate-amplexicaul-leaved species of sandhills; flowers of the latter are pinkish or lavender.

Habitat and Management Implications

W. carteri frequents both yellow and white sand sandscrub sites, where pine is scattered in the overstory and made up of Pinus clausa, P. palustris or P. elliottii and where a variety of oaks such as Quercus laevis, Q. incana, Q. geminata, Q. myrtifolia, Q. chapmanii, etc., Carya floridana, Bumelia tenax, Asimina obovata, Chionanthus, Lyonia ferruginea, Ilex ambigua, etc., make up the scrubby understory. The saw palmetto, Serenoa repens is frequent to common. The sandy substratum is moist to quite dry, varying in color from yellow to nearly white, depending on the clay content. The Warea is normally found where the scrub is of low density or where, through a combination of fire and wind action, open patches of sand have developed. It may be associated with Selaginella arenicola, Pteridium, Opuntia, various Galactia, Paronychia hernarioides, P. chartacea, Lupinus cumulicola, Clitoria, several Euphorbia, Eryngium, Berlandiera subacaulis, many species of Aristida, Andropogon, Dichanthelium, Panicum, Bulbostylis warei, B. ciliatifolia, in other words species that are typical of sandy scrubland clearings or high pineland. As is true of most other annual herbs that inhabit this system, this is a plant of full sun or light shade, it is a poor competitor, and was probably maintained by woods fires that kept scrub vegetation reduced or by creation of small blowouts and sandy exposures through wind action.

The greatest threat to this particular species is urban expansion, with much of its former area now converted to residential lots, together with a replacement of scrub habitat by orange groves.

References

- Channell, R. B. & C. W. James 1964. Nomenclatural and taxonomic corrections in Warea (Cruciferae). Rhodora 66 (765): 18-26.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 573-574. Chapel Hill, N.C.

SPECIES Warea carteri Small. Carter's warea

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy							X	
Damage								X
No Lasting Effect		X	X	X				
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Warea carteri Small



CAPRIFOLIACEAE

Viburnum bracteatum Rehd. Southeastern viburnum

Technical Description

Tightish-barked shrub to 3 meters, the branches spreading-arching, the branchlets tan, terete, slender, smooth, aging to gray-brown.

Leaves.--Deciduous, opposite, the petioles short, usually less than 2 cm, spreading-ascending, greenish-brown or reddish-brown, sparingly hirsute with glandular hairs, the stipules persistent, pale red-brown, linear, ciliate, 3-10 mm long, the blades elliptic to broadly ovate or suborbicular, (4-) 6-12 cm long, acute to short-acuminate, rather remotely sinuate-dentate (ca. 1 tooth/cm), the base rounded or cordate, the upper surface a rich, dark green, smooth, the lower surface paler, pilose-hirsute along the pinnate veins, otherwise smooth or glabrescent.

Inflorescence.--Cymes erect, terminal on glandular peduncles 5-6 cm long, the primary cymal branches several, glandular, at junction with branchlets producing conspicuous greenish bracts, these narrowly oblong to linear, 6-12 mm long, glandular, ciliate, the whole inflorescence 4-6 cm broad, showy, white.

Flowers.--Regular, bisexual, bracteolate, the bracteoles scarious, triangular, pale, ca. 1.0-1.5 mm long, the calyx limb cupuliform, ca. 1 mm deep, irregularly shallowly rounded-lobed, scarious, sparingly ciliate; corolla rotate, ca. 8 mm wide across the limb, 5-lobed, the lobes broadly obovate or nearly round, ciliate, externally sparsely puberulent; stamens 5, epipetalous, the rounded, pale yellow anthers long-exserted; ovary inferior, the body with its covering perianth at anthesis ellipsoidal, greenish, granular.

Fruit.--Drupes when ripe blue-black, oval or ovoid, ca. 1 cm long, the sparingly grooved, somewhat flattened stone ca. 8 mm long.

Distribution and Flowering Season

Calcareous-rocky bluffs, ledges, cliffs along the Coosa River, northwestern Georgia, northeastern Alabama; flowering mostly in May.

Special Identifying Features

In the southeast, this shrub is most similar to two species, V. rafinesquianum Schult., and V. molle Michx., and is probably most closely allied to the former, differing from it mainly in its somewhat longer petioles, its leaves with hairs beneath confined to the main veins (in V. rafinesquianum the whole lower

surface is pubescent, save in var. affine (bush) House) It differs from V. molle in its usually smaller, more remotely toothed leaves, smoother foliage, it persistent and more conspicuous bracts and stipules, and in its tighter bark (in V. molle the bark exfoliates in small plates!).

Habitat and Management Implications

V. bracteatum is part of the shrub understory in open deciduous woodland foresting the steep, calcareous bluffs along the Coosa River. The overstory dominants include Quercus muhlenbergii, Q. shumardii, Q. rubra, Ulmus americana, U. rubra, Carya ovata, C. cordiformis, C. carolinae-septentrionalis, Acer saccharum, Fraxinus americana, F. quadrangulata, etc. Understory and shrub species include Carpinus, Ostrya, Cercis, Amorpha fruticosa, Cornus florida, Hamamelis, Philadelphus, Ilex decidua, Bumelia lycioides, etc. Rooted in the deeper pockets of soil are such herbs as Hepatica, Sanguinaria, Thaspium barbinode, T. trifoliata, Zizia aptera, Thalictrum dioicum, Heuchera americana (with H. villosa on the rocks), Coreopsis auriculata, Trillium cuneatum, Phlox divaricata, etc. Upslope the overstory becomes one of oak-hickory-pine, with an understory primarily of Cornus florida and Vaccinium arboreum. Three other Viburnum, V. rufidulum, V. acerifolium and V. rafinesquianum are present, the latter two with a slight overlap in flowering time, but the peak of flower for V. bracteatum is definitely after the others.

The timber comprising the overstory is merchantable and some has been cut, but the steep terrain tends to protect these woods from intense use and certainly prohibits crop agriculture or foraging except by goats. The main threat to this shrub is from quarrying of the dolomitic limestones. This has destroyed most of the type locality along the Coosa at the southern outskirts of Rome, Georgia, and has wiped out the Alabama locality known to Roland Harper. Perpetuation of the species depends on the setting aside of some of the bluff country this shrub is known to frequent. Since there are many localities of steep limestone bluffs along and near the Coosa River where the plants should be found, further search for it should be conducted and likely areas purchased and preserved.

References

- Rehder, A. 1903. Viburnum, in Sargent's Trees & Shrubs, Vol. I.
- _____. 1904. Preliminary lists of New England plants.
Rhodora 6: 54-61.
- _____. 1940. Manual of cultivated trees and shrubs hardy
in North America. New York.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1270-1272
Chapel Hill.

SPECIES Viburnum bracteatum Rehd. southeastern viburnum

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	NA	NA	NA			NA	
Damage								X
No Lasting Effect						X		
Beneficial if Done Properly					X			

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Viburnum bracteatum Rehd.



CYPERACEAE

Carex biltmoreana Mackenzie. Biltmore sedge

Technical Description

Fibrous-rooted, loosely short-stoloniferous, smooth, caespitose perennial sedge.

Culms.--Tufted, some sterile, some fertile, the decumbent bases often stoloniferous, usually purplish, cloaked by numerous overlapping sheaths, the older ones (and those of previous years) fibrillose, the fertile ones 3-9 dm high, equalled or overtopped by leaf tips, the bases stoutish (to 5 mm thick) but distally slender, sharply angulate, the angles scabrid.

Leaves.--Numerous, strongly overlapping toward culm base, more distant upward on culm, the lowest scale-like or mostly sheath, often fibrillose with age, the longest with sheaths prominent, the rounded backs strongly ribbed, green, purplish proximally, the ventral side scarious, white, truncate or oblique at apex; larger leaf blades flat or slightly revolute, lineal, the widest 5-7 mm broad, strongly nerved, scabrid along the larger nerves and on the margin, the apex strongly tapering, harsh.

Spikes.--Male (staminate) spike lineal, 2-3 cm long, overtopping the uppermost (female) spike, the densely overlapping bracts scarious, oblong, 4-5 mm long, apically obtuse or rounded, marginally pale, submarginally with a broad reddish-brown band, medially around the midrib pale or greenish; anthers pale, ellipsoidal, ca. 1 mm long, exserted on filiform filaments. Female spikes 2 or 3, rather distant, the ultimate one with few florets, thus short, directly subtending the short to elongate (2-3 cm) peduncle of the male spike and subtended by a short-sheathed, setaceous-bladed bract, the lowest spike longest, narrowly linear but erect, mostly 2-4 cm long, the numerous florets crowded at spike tip, scattered and distant toward its base, the peduncle 2-3 cm long, mostly invested by the sheath of the subtending bract, this with sheath and blade similar to upper foliage leaves and often exceeding the staminate inflorescence; female scales scarious, broadly elliptic or oblong-elliptic, ca. 3 mm long, the narrow edge pale, whitish, the convex back otherwise reddish-brown save for a greenish midzone made up of 3 nerves, the apex rounded or obtuse; perigynium obovoid, tightly filled below the apex by the tumid akene, strongly raised-nerved, smooth, green, the very short beak bent abruptly back and appressed to the perigynial summit, its orifice entire, oblique.

Akene.--Plumply trigonous, 2.0-2.3 mm long, the rounded angles pale, the intervals somewhat convex, reddish-brown, smooth.

Distribution and Flowering Season

Seeps over and moist rocky woods around granite extrusions, Blue Ridge, southern North Carolina and adjacent Georgia and South Carolina; flowering in April, fruiting in May.

Special Identifying Features

C. biltmoreana, by a combination of several spikes/culm, the female below the single male, prominent bract sheaths, trigonous fruit with perigynes raised-nerved and perigynial beak short, bent, entire, fits well into the section Paniceae, which is stoloniferous unlike most of the related section Laxiflorae. Within the Paniceae, C. biltmoreana is closest to the rare and montane C. woodii (C. tetanica var. woodii) but that plant has far more slender stolons, much narrower leaf blades, smaller perigynes, and tends to form very large clones, even turfs. Actually there is no other Appalachian Carex that quite resembles C. biltmoreana, which in the field exhibits strong tufts of purplish-based, erect leaves, these arising from mats of browning old leaves and leaf bases of previous seasons, and the somewhat spreading, even nodding leafy fertile culms with their reddish-brown-tinted male and female bractlets.

Habitat and Management Implications

C. biltmoreana is usually found in very steep, granitic sites. Commonly it grows in full sun or slight shade in seeps over masses of extruding granite, thus its roots are almost always wet. Common associated grasses and sedges are Carex muricata, C. atlantica, C. scabrata, Scirpus polyphyllus, S. expansus, Eleocharis, Rhynchospora (mostly R. capitellata), Poa, Trisetum, Sphenopholis, Glyceria. Juncus is common. Sphagnum and other wet ground mosses form part of the mat it roots in. Hedyotis serpyllifolia, Krigia montana, Rhexia virginica, Ludwigia are frequent herbaceous associates, together with numerous rosettes of wetland Aster and Solidago. The overstory, where present, is mostly oak-pine-hemlock and the understory heavy with Rhododendron maximum, R. catawbiense, R. minus, R. calendulaceum, Gaylussacia ursina, Leucothoe, Lyonia, Vaccinium, etc. C. biltmoreana is perhaps the most rare of southern Appalachian carices, but within its small range is often overlooked because of the difficult terrain it grows in. I have seen it in places where a climbing rope is necessary to reach the plants with any feeling of security.

The species probably is rare, but nonetheless safer than are many other more abundant species in that the steep country in

which it grows is not easily logged, the sites are poor for timber overall, the opportunity for exploitation of the rugged landscape for forestry or for residential or commercial purpose is slight. It is not likely to lose much habitat in future years save through some accidental factor that would alter the massive granites it grows upon.

References

Mackenzie, K. K. 1940. North American cariceae, Vol. II. nos. 277-278. New York Botanical Garden.

Small, J.K. 1933. Manual of the southeastern flora, pp. 214-215. Chapel Hill, N.C.

SPECIES Carex biltmoreana Mackenzie. Biltmore's sedge

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			NA	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Carex biltmoreana Mackenzie



CYPERACEAE

Carex latebracteata Waterfall. Waterfall's sedge

Technical Description

Tufted, smooth perennial sedge from a fibrous root system.

Culms.--Both fertile and non-flowering leafy offshoots produced, usually in large tufts, the culm bases covered by sheathes of the erect leaves, the peduncle strongly triangular, strongly wing-angled, the pale wing minutely scabrid-edged, to 3 dm long, usually overtopped by the leaves.

Leaves.--Lowermost (outer) leaves primarily sheathing, scale-like, straw-colored, essentially bladeless; full sized foliage leaves 3-5 dm long, erect or ascending, the sheaths pale green, soft, the margins broad, scarious, inrolled, red-dotted, convergent apically to form a scarious, prominent, obtuse to acutish ligule, or auriculate apically; leaf blades linear, tapering gradually at the apex, the larger ones fully 1 cm broad, pale green, blue-green or often glaucous, multinerved, the medial nerve prominently raised beneath, the marginals pale, broadish, serrulate, making a conspicuous border.

Inflorescence.---Spikes solitary and terminal, the basal portion female, terminally male; female bracts of two sorts, the lower 5-6 leaflike, asymmetrically keeled at their bases, longer than the whole spike and concealing it, erect, sheathless, the lowermost longest, (3-) 4-8 (-10) cm long, linear-elliptic, caudate or cuspidate, similar in character to foliage leaf blades, and often sterile, these bracts progressively shortening at each node of the spike rachis, each subtending a female floret, thence abrupt-16 shortening to pale, whitish, broadly obovate, scarious, rounded female bracts shorter than the perigynal body, each with a narrow, arced, transverse band distally and ca. 2.5-3.0 mm long; male bracts few, tightly imbricate, similar to upper female bracts.

Florets.---Female floret with style long-exserted, reddish-brown, strongly papillose, the stigmas 3, short-linear, excurved; male floret with anthers ca. 2 mm long.

Fruit.---Ripe perigynes ca. 8 mm long, the body obpyriform, ca. 5 mm long, tightly filled by the akene, somewhat triangular at the narrowed base, obscurely so or entirely tumid above, smooth, thence abruptly narrowed to a narrowly triangular, deeply and obliquely slit, scarious-orificed beak; perigynal surface with 1-3 strongly raised, continuous nerves, several less-raised incomplete nerves, and several finely impressed longitudinal nerves, white. Akene broadly obovoid, obscurely trigonous, ca. 3 mm long, the angles broadly rounded, the intervals convex, the surface minutely cancellate, pale greenish-white.

Distribution and Flowering Season

Rocky, open-forested, hardwood slopes and ravines, bluffs, south-

eastern Oklahoma and southwestern Arkansas; flowering in April and May.

Special Identifying Features

The single androgynous spike concealed by large, spathe-like bracts, combined with smooth perigynes, basally joined male bracts, and the style base jointed directly to a blunt akene apex all place this Carex in section Phyllostachyae, which in North America has but four other species. Only two of these, C. jamesii Schw. and C. willdenovii Schk., are widespread in the southeastern U.S.; both are narrower leaved and lack the broad, strongly concealing, lower female bracts. Thus this species is more similar to C. backii Boott and C. saximontana Mackenzie, the former inhabiting dryish woods and clearings from New England and southern Canada westward to British Columbia and Wyoming, the latter on dryish hillsides, usually under pines, from western Minnesota and Manitoba westward to Oregon and British Columbia. However, C. latebracteata has only the lower female bracts leaf-like, while in C. backii all are leaflike. Therefore C. latebracteata is closest to C. saximontana but differs (a.) in having much larger perigynes (b.) in its more robust habit and (c.) in its longer, broader leaves.

Habitat and Management Implications

Carex latebracteata is locally abundant along the stream systems of the Ouachita mountain area of southeastern Oklahoma and southwestern Arkansas. It may be found usually on steep slopes and bluffs under Pinus echinata-mixed hardwood, mesic hardwood, oak-hickory, or in natural or artificial clearings thereof. The soil is shallow to deep, the common parent materials being from shale, calcareous rock, or novaculite, is usually a sandy loam, clay loam, or sandy clay loam. The overstory may range from dense forest to quite open stands and some common woodland herbaceous associates are Dentaria, Hepatica, Sanguinaria, Corydalis flavula, Thaspium barbinode, other carices, Dodecatheon meadia, Valerianaella palmeri, Streptanthus squamiformis, Phlox pilosa, Monarda russelliana, M. bradburiana, Scutellaria parvula, Penstemon arkansana, Silene virginica, Phacelia hirsuta, etc. In evidence are also many Panicum, Melica, Bromus purgans. Thus, some herbaceous associates are those of open dry woodlands and clearings, others of moist, rich, loamy woodlands, an indication that this sedge is rather ample ecologically. While the plants are best developed in shade, they appear to persist in artificial clearings such as made for powerlines or roads, or in very open steep poor woodlands over thin-bedded shale talus. They are eliminated by mechanical site preparation methods where the soil is radically disturbed, and none are seen where the forest was a mixed type but has become plantation pineland. The principal threat to the species appears to be in the conversion of woodlands to plantation pineland, or with the cutting down of hardwood

or pine-hardwood for conversion of the land to crop agriculture or grazing. However, the steepness of the terrain inhabited by much of this species and the relatively low quality of the timber, plus much of its acreage being in state park or National forest, give it a good chance of survival.

References

- Hermann, F. J. 1970. Manual of the Carices of the rocky mountains and Colorado Basin. U. S. D. A. Agric. Handb. 374.
- Waterfall, U. T. 1954. A new species of Carex (Sect. Phyllostachyae) from Oklahoma. Rhodora 56: 21-23.

SPECIES Carex latebracteata Waterfall's Waterfall's sedge

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy							X	x
Damage		X	X	X		X		
No Lasting Effect	X				X			
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Carex latebracteata Waterfall



CYPERACEAE

Carex misera Buckl. Wretched sedge

Technical Description

Densely tufted, perennial sedge, increasing by short, scaly lateral offshoots.

Culms.--Both sterile and fertile present in a clump; the growth slender, at first erect, then lax and drooping, mostly 2-4 dm long, proximally enfolded by sheaths, above these narrowly linear, sharply triangular, scabrid-hispidulous along the edges, dark green, ribbed in the intervals.

Leaves.--Numerous, crowded toward shoot base, the lowest scale-like, mostly sheath, purplish-red; foliage leaves with sheaths elongate-tubular, closed, the backs sparsely to copiously hirtellous, strongly ribbed, pale green, toward base reddish, the ventral (inner) side thinner, paler, and smoothish; ligule narrow, erect, scarious, ciliate; leaf blades narrowly linear, 1.0-1.5 mm wide, tapering-tipped, the upper surface, particularly toward the base, pilcsulous, the lower surface less so or smooth.

Inflorescence.--Spikes usually 3 or 4, the uppermost exclusively male, the lower 2 or 3 exclusively female, the lowest subtended by a sheathless blade similar to a foliage leaf but shorter, its tip reaching to just below or just beyond the tip of the male spike; male spike on a peduncle 2-3 cm long, narrowly elliptic-linear, reddish, 1.5-2.0 cm long, the bracts tightly overlapping; female spikes narrowly linear, the uppermost shortest and most compact, the florets overlapping in a loose spiral, the lowermost long-pedunculate, more elongated, to 2.5 cm long, with the lowermost florets distant.

Florets.--Male flore with bracts oblong, ca. 4 mm long, apically obtuse or narrowly rounded, sometimes apiculate, scarious, reddish-brown, the midnerve and medial band green or dark, dull brown; female bracts elliptical to lanceolate or lance-ovate, 2.5-3.5 mm long, acute to acuminate, scarious, reddish-brown and with or without a pale border, the midnerve and medial zone green; perigynia narrowly fusiform, ca. 4-5 mm long, 3-angled, the interfaces nearly flat and angles rounded, with few nerves, only 2 continuous from base to apex, the beak essentially toothless, short, hispidulous around the truncated orifice.

Fruit.--Akene trigonous, in outline oblong-ellipsoidal, ca. 2 mm long, with an apical apiculus (style base) ca. 0.3 mm long, the interfaces slightly convex, the surface smooth, pale brown, the base narrowed, but definitely not stipitate.

Distribution and Flowering Season

Shaded or (rarely) sunny granitic rock faces and cliffs, Blue Ridge, eastern Tennessee and western North Carolina south into northern Georgia; fruiting (and this is the only time one collects Carex for determination!) in May and June.

Special Identifying Features

This species is distinguished from other "Gracillimae" by its combination of lax habit, hairy, narrow leaves, reddish-tinted male and female scales, and its exclusively male terminal spike, together with the sheathless lower inflorescence bract.

Habitat and Management Implications

Carex misera is usually found in moist to wet, shaded, moss-carpeted seeps over acid rock, this usually granite or metamorphosed granite. Usually it is not far from summit elevations in the Blue Ridge, thus may be under evergreens such as red spruce, balsam, white pine, hemlock, or under a mixture of hardwoods, particularly oaks, yellow-birch, red and sugar maple, buckeye, basswood, etc. The understory is mainly occupied by ericaceous shrubs, particularly various Rhododendron (both evergreen and "Azalea" types), Lyonia, Gaylussacia (mostly G. ursina), Menziesia, etc. Generally, on the rock faces its associates other than bryophytes are many ferns, other Carex, grasses, various saxifrages, Mitchella, Krigia montana, etc. I have been informed that sometimes tufts of this species may develop on seepage over rock that has been exposed in process of road cutting, but have experience with it only from shaded, undisturbed sites. Removal of the forest overstory that helps to keep the rock faces shaded, cool and moist is bound to have a traumatic effect on such plants as C. misera, at the very least tending to dry out the habitat to the point where it would be detrimental.

References

- Mackenzie, K. K. 1940. North American Cariceae II: caption and plate 332. New York Botanical Garden.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 191-235. Chapel Hill, N.C.

SPECIES Carex misera Buckley. Wretched sedge

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	NA	NA	NA			NA	
Damage					X	X		X
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Carex misera Buckley



DIAPENSIACEAE

Pyxidanthera brevifolia Wells. Well's pixie-moss

P. barbulata Michx. var. brevifolia (Wells) Ahles

Technical Description

Mosslike, much-branched, creeping evergreen subshrub forming dense low mats.

Stems.--Older shoots slender, with a thin, rectangular-anastomosing gray-brown bark; newer shoots cloaked densely by spirally imbricated scale-like remnants of foliage leaves, the more recent growth with the short, pale green internodes densely white-tomentulose.

Leaves.--Mosslike, set in close spirals, spreading or ascending, mostly narrowly elliptic to oblanceolate or lanceolate, mostly 3-5 mm long, somewhat fleshy, firm, acute to narrowly acute or short-acuminate, the tip callus-apiculate, the margin thick, entire, the base acute or attenuate, sessile or nearly so, pale green or sometimes tinged with maroon, the upper surface white-villous-pilosulous, the lower surface essentially smooth or sparsely villous proximally.

Inflorescence.--Flowers solitary and terminal on numerous short branches, closely subtended and surrounded by spreading, closely spiralled leaves of shoot tips and reminding one of the antheridial heads of Polytrichum.

Flowers.--Perfect, regular; sepals 5 (-6), joined at very base, ca. 3-4 mm long, the lobes broadly obovate, rounded, imbricated in bud, reddish-pink, ciliolate; petals usually 5, fused at base, the spreading-ascending lobes broadly spatulate or narrowly obovate, ca. 3-4 mm long, apically broadly rounded, slightly erose, white; stamens 5, alternating with petal lobes, adnate to short corolla tube, the filaments linear, flattened, stiffly ascending, 1.5-2.0 mm long, the truncated apex inflexed, bearing a pair of white, divergent anther sacs slightly longer than 1 mm, each tapering downward to a sharp, conic spur, opening by a transverse slit; ovary superior, ovoid, 3-locular, the style straight, erect, simple, terminating in an obscurely 3-lobed stigma.

Fruit.--Capsule smooth, ovoid, ca. 2 mm long, loculicidally dehiscent; seeds axile, dark brown, reticulate, ca. 0.7-0.8 mm long.

Distribution and Flowering Season

Deep dry sands of open woods, inner Coastal Plain of North Carolina and adjacent South Carolina; flowering in March and April.

Special Identifying Features

P. brevifolia has been considered by many recent workers to be

merely a variant of the commoner Pixie-moss which occurs in dryish pineland barrens, bog edges, from New Jersey southward to eastern South Carolina. Primack & Wyatt (1975) contend that the plants of the high sandhills of the inner Coastal Plain represent a part of a clinal system. The material as represented in the type locality is, however, different in being shorter leaved, with villous tomentum abundant on the upper leaf surfaces, and with smaller flowers. Material from Chesterfield County (Sugarloaf Mt.) South Carolina appears to exhibit characteristics of both. My comments about P. brevifolia are confined to the comparatively "pure" populations of Harnett County, North Carolina.

Habitat and Management Implications

The ideal habitat for P. brevifolia is deep, dryish, coarse sand with a scattering of longleaf pine and turkey oak dominant in the overstory and in the understory Vaccinium, Gaylussacia, other ericads, these becoming most abundant in the swales. Selaginella arenicola, Stipulicida setacea, Arenaria caroliniana, Baptisia (several species), Euphorbia, Lithospermum carolinense, Tradescantia (especially T. rosea), Opuntia, Heterotheca (particularly the local H. pinifolia), grasses such as Aristida, Sporobolus, Andropogon, Leptoloma, Panicum, populate the sands together with several sorts of lichen and dryland bryophytes, but the overall effect is one of considerable bare patches of substrate. The pixie-moss forms large clumps, often around the bases of the trees, tending to be more compact in habit on the driest sites, on slightly moister substrates more trailing in habit. Mechanical site preparation techniques would be devastating to these shallow-rooted mat formers, though single tree removal or clear cutting would probably not effect them adversely. These sandhills have had a history of fire, thus as a factor it has probably tended to maintain a vegetational type favorable to the pixie-moss.

At present the major threat to Well's pixie-moss has come from development of some of the sandhills for residential purposes. The largest patch (type locality) has actually been largely destroyed through the construction of a large mobile home sales part (at Spout Springs).

References

- Ahles, H. E. 1964. New combinations for some vascular plants of the southeastern United States. Journ. Elisha Mitchell Sci. Soc. 80: 172-173.
- Primack, R. B. & R. Wyatt. 1975. Variation and taxonomy of Pyxidanthera (Diapensiaceae). Brittonia 27 (2): 115-118.

Radford, A. E., H. E. Ahles & C. R. Bell. 1968. Manual of the vascular flora of the Carolinas, pp. 817-819. Chapel Hill, N.C.

Small, J. K. 1933. Manual of the southeastern flora, pp. 1018-1020. Chapel Hill, N.C.

Wells, B. W. 1929. A new pixie from North Carolina. Journ. Elisha Mitchell Sci. Soc. 44: 238-239.

SPECIES Pixidanthera brevifolia Wells. Well's pixie-moss

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Pyxidanthera brevifolia Wells



ERICACEAE

Rhododendron vaseyi Gray. Shell-pink azalea

Biltia vaseyi (Gray) Small

Technical Description

Deciduous shrub 1-3 (-5) m tall, with few to several, erect to ascending primary shoots, the bark grayish or gray-brown, thin, tending to crack longitudinally and exfoliate.

Twigs.--Branching deliquescent, often pseudowhorled (as in most Rhododendron), the bark of older wood grayish or gray-brown, cracking and exfoliating in long, thin plates, that of new shoots more reddish, sessile-glandular, the buds ovate, imbricate, the bud scales glandular-ciliate with backs glandular-punctate.

Leaves.--Alternate, estipulate, spreading on short, glandular petioles, the blades elliptic to obovate, 4-7 (-15) cm long, acute, entire to irregularly crenate-serrulate, also hirsute-ciliate, cuneate, the surfaces dark green, the upper surface scattered-stipitate-glandular, hirtellous along the midrib, the lower surface scattered-hirsute, the long hairs admixed with a scattering of short, sometimes gland-tipped hairs, the midrib and major veins often hirsute.

Inflorescence.--A compact, subsessile, 3-many-flowered terminal raceme reaching anthesis as the leafy shoots expand and forming a showy, ball-like mass 5-10 cm broad of woody smelling flowers, these on slender, spreading, reddish, glandular pedicels ca. 2 cm long.

Flowers.--Irregular, perfect; calyx gamosepalous, ca. 2 mm high, 5-parted, oblique, corona-like, the lobes unequal, low-triangular, glandular-margined, green; corolla gamopetalous, rotate, 2.5-3.0 cm long, the 5 spreading, broadly oblong to ovate, rounded lobes much longer than the campanulate base, somewhat unequal, the lowest largest and the lower laterals next largest, all smooth, shell pink, grading to pale pink mottled with deep rose flecks or streaks toward the throat within, particularly on the lower and lateral petals; stamens 5-7, hypogynous, the filaments unequal, but all slender, pale, arching outward and forward, thus upswept, exerted beyond the corolla, the longest often 3-4 cm long, terminating in broadly elliptic-oblong, poricidal, dorsifixed, rosy or dull purple, smooth, anthers ca. 2 mm long; ovary superior, lance-ovoid, green, stipitate-or-sessile-glandular, ca. 4 mm long, the style outwardly and upwardly swept as are the filaments, often exceeding them, slender, pinkish, stipitate-glandular, the stigma capitate, 5-lobed.

Fruit.--Capsule lance-cylindric, septicidal, somewhat woody, ca. 1.5 cm long, brownish, stipitate-glandular, often with the style persisting.

Distribution and Flowering Season

Moist to wet, acid swamps and bogs, at elevations of over 3000 ft., Blue Ridge of North Carolina from Ashe County south to Macon and Transylvania counties; flowering in May and June.

Special Identifying Features

R. vaseyi is very distinctive in that it is the only deciduous Rhododendron in the Southeastern Area that regularly has more than five stamens, yet less than the 10 that consistently are found in the evergreen species (R. minus, R. catawbiense, R. maximum) which also have entire, rather than serrate, leaf margins. Unlike the rest of the "azaleas", the corolla tube of R. vaseyi is much less than 1/2 as long as the corolla limb and the corolla surface is smooth rather than pubescent or glandular-pubescent. One is reminded, on seeing this species in nature, of a deciduous R. minus.

Habitat and Management Implications

R. vaseyi is always shallowly rooted in moist to wet, acidic, fern-dappled substrates, generally springy sites along mountain streams or in mountain bogs. the overstory may contain Tsuga, Pinus strobus, Picea, mixed with Acer rubrum and other maples, Aesculus, Quercus rubra, Tilia. The understory is mostly heath, being various species of Rhododendron, mostly R. maximum, Leucothoe editorum, Vaccinium, etc., Sambucus, Viburnum (mostly V. cassinoides), etc. The overstory, being composed of several valuable species, has a history of logging. The mechanical disturbance accompanying this however appears to have had little adverse impact, the R. vaseyi often increasing in the artificial clearings and also along rights of way by roads. The main danger facing this particular species comes from the irresponsible and uncontrolled development of vacation and retirement housing in this scenic part of North Carolina, which often results in total habitat destruction. Damming of small mountain streams along which R. vaseyi grows has destroyed some habitat. Drainage has destroyed some bogs. The plants are extremely beautiful in bloom, thus are dug and hauled away by nurserymen and others, mostly amateur gardeners. This last activity is not necessary, since all Rhododendron root easily from cuttings.

References

- Radford, A. E., C. R. Bell & H. Ahles. 1968. A vascular flora of the Carolinas, pp. 797-801. Chapel Hill, N.C.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 993-998. Chapel Hill, N. C.

Wilson, E. H. and A. Rehder. 1921. A monograph of Azaleas.
Cambridge, Mass.

SPECIES Rhododendron vaseyi Gray. shell-pink azalea

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA				
Damage	X							
No Lasting Effect								X
Beneficial if Done Properly					X	X		

Other Comments: site drainage would be deleterious!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Rhododendron vaseyi Gray



EUPHORBIACEAE

Euphorbia discoidalis Chapman

E. curtisii Engelm. in part

Tithymalopsis discoidalis (Chapm.) Small

T. apocynifolia Small, in part

Status: Threatened?

Technical Description:

Perennial, milky-juiced, from an elongate simple or branched, deepset, fleshy rootstock, the lower part of the stems and lower branches often deeply buried.

Stems: erect or ascending, arising from below the ground line so that a single plant may look like a clump, above the ground line reaching mostly 3-7 dm high, simple toward base or branching throughout, with branches at each level successively shorter, ultimately very short, this producing a profusely forking-branched crown of scattered involucre; axis near the ground terete, developing a thin, dull-brown, anastomosing bark with narrowly diamond-shaped or linear cracks, upwardly terete with several low, rounded ribs, greenish or sometimes tinged with red, smooth or with a scattering of soft, pale hairs, particularly on nodes and ultimate branchlets.

Leaves: mostly alternate on lower main axis, becoming whorled at the first branch node, opposite along most of the primary and secondary branches, sessile or petiolate, minutely hairy-stipulate, those of the main stem often lost by flowering time; blades ascending to reflexed, ranging from filiform through linear to narrowly oblong, elliptic, ovate or even oblanceolate or obovate, 2-5 cm long, apically narrowly to broadly rounded, the margin entire, strongly revolute, the base rounded to acute or cuneate, the petiole 3 mm long or less or absent, if present pilose or hirsute, the upper blade surface yellow-green, impressed veiny, rarely with a scattering of hairs, the lower surface paler, smooth or densely to slightly pilose, in narrower leaves with only the raised midrib evident, in broader leaves with pinnate-laterals also raised; leaves of inflorescence often abruptly smaller above the lowest pair or whorl, usually present as pairs or in whorls of 3 at levels of branching, commonly linear or oblong, less often elliptic or broader, usually spreading, smooth or pubescent, as in lower leaves.

Inflorescence: a dichotomously forking compound of cymes bearing cupuliform glands in the branch axils, the branches slender, smooth or pilose; involucre (cyathia) small, campanulate, mostly 1.0-1.5 mm high from base to rim of cup, pale green, pale red or yellow-green, appressed-white-hairy, the 5 reniform glands at margin of cup with broadly obovate, reniform or rectangular or squarish, white, pink, or yellowish-white petaloid appendages, these mostly 1.5-2.0 mm long, spreading, broadly rounded, entire or wavy-margined.

Flowers: as in Euphorbia, namely with several single-stamened male florets and 1 female floret/cyathium, the androphore and filament of a stamen projecting the anthers to about the mouth of the cyanthium, the female stalk projecting the strongly 3-lobed ovary slightly beyond the cyathial rim at anthesis, still further as the fruit forms, the

ovary body subglobose, strongly 3-lobed, the style 3-branched, with each branch rebranched into short-linear excurved stigmas. Fruit: Capsule globose or depressed globose, strongly 3-lobed, mostly 2.5-3.0 mm high, the fruit stalk 3-5 mm long; capsule valves yellowish-green, rarely reddish-green at maturity, externally smooth; seed nearly round to broadly obovoid or ellipsoidal, pale gray, smooth, with minute rows of shallow pits, ca. 2 mm long, the rounded backs with a low medial ridge, the inner side with the raphe forming a longitudinal low groove.

Distribution and Flowering Season:

Open sandy woodlands, sandy clearings, sandhills, Coastal Plain, southwestern Georgia, northern Florida, southern Alabama; flowering from late August to frost.

Special Identifying Features:

This species was thought by its original author to be confined to the pinelands of northwestern Florida, and the earlier descriptions of it call for a narrow-leaved plant. Dr. Michael J. Huft, current monographer of this part of Euphorbia (Tithymalopsis, Agaloma) has seemingly much broadened the concept of the species so as to include several other "taxa" (including E. curtisii Engelm. in part) that have smallish cyathia but proportionately larger petaloid appendages and a common seed character. If this broadened description is accurate, E. discoidalis then ceases to be the rare narrow-leaved entity of the Florida pinelands and becomes a rather weedy plant that is frequent in much of southern Alabama and Georgia as well as Florida. It, in this broadened sense, is distinguishable from others of the complex by a combination of profuse branching, comparatively low level of red pigmentation of cyathia, hairy nodes, petioles and cyathia, and relatively short-peduncled cymules, the short, ultimate brachlets terminating in but a single cyathium.

Habitat and Management Implications:

E. discoidalis is ecologically more ample than is the definitely more rare E. exserta. It is commonest in the Longleaf Pine-deciduous scrub oak type but may be encountered also in oak-hickory-yellow pine uplands, wherever the soils are sandy. Some common associates are Aristida (particularly A. stricta), Andropogon (ternarius, virginicus, gyrans), Gymnopogon ambiguus, Tridens, Triplasis, Sorghastrum secundum, Paspalum, many dichanthelium Panicum, Erianthus, Cyperus filiculmis, C. retrorsus, C. plukenetii, Rhynchospora grayii, Bulbostylis ciliatifolia, Tradescantia, Commelina erecta, other euphorbiaceous plants such as Tragia, Acalypha, Crotonopsis, Cnidioscolus, many legumines including many Lespedeza and Desmodium, Galactia, Crotalaria, Petalostemon carolinianum, Astragalus, Lupinus (particularly L. nuttallii, L. villosus), Tephrosia, and many composites including species of Eupatorium, Liatris (L. tenuifolia, L. gracilis, L. elegans), Helianthus, Heterotheca, Verbesina aristata, Vernonia angustifolia, Aster (particularly A. adnatus, A. concolor, A. patens, A. dumosus), and Silphium.

This plant appears to have increased as a result of disturbance. Areas in various stages of site preparation have an abundance which continues until the crowns of plantation pine close. In naturally stocked uplands it increases as a result of woods fires which

reduce competing woody vegetation.

References:

Chapman, A.W. 1897. Flora of the southern United States, ed. 3,
pp. 422-426.

Small, J.K. 1933. Manual of the southeastern flora, pp. 798-800.

SPECIES: Euphorbia discoidalis Chapman

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy							X	
Damage								
No Lasting Effect		X	X	X				X
Beneficial if Done Properly	X				X	X		

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Range of:
Euphorbia discoidalis Chapman



FABACEAE

Baptisia megacarpa Chapm. ex Torr. Streamside wild indigo

?B. riparia Lairsey

Technical Description

Perennial legume from tough, fibrous, deep rootstock.

Stems.--Solitary or several from the crown, to fully 1 meter long (-1.5 meters), the leafless stem base usually stout, terete, smooth, pale green, often glaucous, divaricately branching, zig-zag and rebranching distally, thus forming a broad, yet shallow crown.

Leaves.--Palmately bi-or-tri-foliolate on spreading-ascending petioles, these parsely hirsute at very base, and much shorter than the leaflets; leaflets spreading, obovate to narrowly or broadly elliptic or rarely ovate, mostly 5-15 cm long, apically narrowly rounded or acute, entire, the bases mostly cuneate, the upper surface dark yellow-green, smooth, the lower surface very pale, markedly reticulate, smooth or sparingly hirsute along the midrib and main lateral veins; stipules early deciduous.

Inflorescence.--Flowers few to many in both terminal and axillary indeterminate racemes on slender peduncles longer than the petioles of subtending leaves, usually spreading-drooping, the spreading-ascending pedicels losing their narrow, scale-like, bracts by anthesis. Racemes, including peduncle, highly variable in length, mostly 5-15 cm long.

Flowers.--Regular, zygomorphic, fully 2 cm long on slender, smooth pedicels at anthesis ca. 1 cm long, in fruit to 2 cm, the calyx at anthesis ca. 1 cm long or slightly less, campanulate, the orifice slightly oblique, the limb slightly bilabiate, the teeth 4, triangular, shorter than the tube, the upper tooth shorter and broader than the lower 3, apically bidentate, the outer surface pale green, smooth, raised-veiny, the inner surface villosulous; corolla papilionaceous, cream, the petals 5, projecting forward, clawed, the banner ca. 1.5 cm long, its blade broadly ovate to sub-orbicular, retuse, the wing petals slightly longer with oblong, round-tipped blades, the keel petals longest, ca. 2.0 cm, their blades excentrically oblong, apically rounded, proximally auricled; stamens 10, distinct, ca. 1.5 cm long, the slender but flattened pale filaments projected forward around the ovary, hidden in the curvate keel, the yellow, ellipsoidal, basifixed anthers ca. 1 mm long; ovary superior, including the long style about as long as the stamens, the body lance-linear, slightly laterally compressed, nearly smooth to hirtellous, strongly stipitate.

Fruit.--Legume broadly obovoid, broadly ellipsoidal or broadly short-cylindric, very bladdery-inflated, mostly 3-5 cm long, the valves thin, pale brown, glabrous, the veins forming a raised fine reticulate, the stipe hidden in the persistent calyx, the slender style persistent, ca. 1 cm long. Seeds numerous, in outline elliptical,

somewhat compressed laterally, smooth, ca. 3 mm long.

Distribution and Flowering Season

Moist shaded ravine slopes, streambanks, bluffs and rises in sandy bottoms, northwest Florida, southwest Georgia and southeast Alabama; flowering from late April to early June.

Special Identifying Features

This tallish, broad-crowned, woodland species has a somewhat confused taxonomy; extremes of it may be actually what has been called B. riparia Lairsey and B. riparia var. minima Lairsey. These, described from flowering, not fruiting material are supposed to be distinguished by their narrower leaflets and hairier ovaries, but such characters appear to blend into extremes of B. megacarpa. It is probably best to refer to all cream-petaled, short-racemed, smoothish, trifoliate Baptisia which have thin-walled, inflated legumes, if they are from riparian systems of that area, as B. megacarpa.

Habitat and Management Implications

B. megacarpa grows in light to deep shade, or at edges of woods, is rooted in fine sands, sandy loams or sandy alluvium, sometimes on sandy rises in large bottoms. The overstory may range from mixed mesophytic to pine-hardwood with the common pines being loblolly or spruce pine, the commoner hardwoods being willow oaks, elm, hickory, ash, bull bay, yellow poplar and sweet gum. It is in sites that rarely dry, but which at the same time would rarely flood. It is normally associated with spring woodland herbs that require well drained, moist, loamy substrates and which tend to disappear when the overstory is removed. The rich sites in which this plant grows are excellent for quality hardwoods and pine and as a consequence are being, or have been, heavily logged; this may in part explain the comparatively rare occurrence of B. megacarpa, though some good localities may support hundreds, even thousands, of plants. Selective logging, if this does not result in severe mechanical disturbance or erosion of the sloping sites, probably has no adverse effect. Clear cutting poses a danger for several reasons, even if there is not mechanical site preparation. First, full sun and subsequent drying and loss of humus from such sites, would be detrimental. Second, the advent of Lonicera japonica, Rubus, Smilax, Pueraria, all of which tend to crowd out original ground cover in such disturbed habitat, would eliminate this species.

References

- Lairsey, Mary M. 1940. A monograph of the genus Baptisia.
Ann. Mo. Bot. Gard. 27: 119-244.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 674-678.

SPECIES Baptisia megacarpa Chapm. ex Torr. streamside wild indigo

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	X	X	X		X		
Damage								X
No Lasting Effect					X			
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Baptisia megacarpa Chapm. ex Torr.



FABACEAE

Clitoria fragrans Small. Sweet-scented butterfly-pea

Martiusia fragrans Small

Technical Description

Subshrubby, perennial, smoothish herbs from a stout, woody caudex, this producing very deep, thick, linear-clavate roots.

Stems.--One-to-(usually) many, slender but stiffly erect or ascending, terete, 3-7 dm tall, deep green tinged with purple, slightly glaucous, usually leafless toward the base at flowering time, only the paired, triangular-ovate, scale-like stipules persisting, simple or sparingly ascending-branched from mid-stem up, there very slender and zig-zag, minutely puberulous.

Leaves.--Alternate, trifoliolately compound, persistently stipulate, the stipules scale-like, narrowly ovate-triangular, strongly ribbed, reddish-brown, ca. 3 mm long (smaller toward stem tips); petioles colored as in stems, slender, spreading-ascending, minutely puberulous, the length various but usually about as long as the lateral leaflets subtended; leaflets 3, pinnate, the larger ones mostly 2-5 cm long, firm, linear to oblong, narrowly elliptical or narrowly lanceolate, rounded to obtuse or shallowly emarginate, mucronulate, entire, slightly revolute, the bases rounded to short petiolules, these subtended by short, triangular-linear, purplish stipels; upper surface dark green, strongly reticulate with a scattering of minute, hooked hairs, the lower surface markedly paler, raised-reticulate, smooth or sparingly strigose along the major veins.

Inflorescence.--Flowers both chasmogamous and cleistogamous, the former showy, (1-) 2 (-3) on spreading-ascending, axillary, stout, purplish peduncles slightly shorter than subtending petioles, apically bearing 2 pairs of purplish, narrowly-triangular, scale-like bracts 2-3 mm long, these subtending stiffish, erect or ascending, puberulent, pale green pedicels 3-5 mm long.

Flowers.--Perfect, zygomorphic, spreading; chasmogamous flowers large, showy, with a faint fragrance, subtended by a pair of purplish, narrowly triangular, rigid scalelike bracteoles ca. 5 mm long, the calyx narrowly funnelform, gamosepalous, indistinctly bilabiate, ca. 1 cm long to the base of the deepest sinus, the lower lip ca. 7-8 mm long, deeply cleft into 2, narrowly triangular, subulate teeth, the upper lip deeply cleft into 3 more broadly triangular teeth; surface externally puberulent, green with teeth purplish; petals 5, distinct, the banner half-moon-shaped in bud and folding sharply over the rest of the petals, when expanded 4-5 cm long, obovate or even rhombic, the bulk of the blade bent upward, pale blue with purplish prominent veins and a broad, whitish basal-medial "eye"; wing petals much shorter than the banner, projecting

forward and largely concealing the 2 keel petals, oblanceolate or spatulate, yellowish-white; keel petals shorter still, strongly clawed, the small, broadly oblong blades very curved on the lower margin; stamens 10, smooth, diadelphous, projecting forward and upward, 1.5-1.8 cm long, the 9 fused filaments joined to above the middle, the basifixed pale yellow anthers ca. 1 mm long, erect; ovary superior, smooth or minutely hooked-hairy, linear-upcurvate, ca. 1 cm long, prominently stipitate, the style more slender, upcurved, ca. 7-8 mm long, distally pilose, the stigma very small, capitate.

Fruit.--Ripe legumes oblong, somewhat flattened laterally, 3-5 cm long (exclusive of persistent style base or "beak"), 7-9 mm broad, exserted beyond the calyx on an uncinat-puberulent stipe fully 1.0-1.5 cm long, splitting along both sutures to expose a row of 3-9 broadly oblong to subglobose or angular, dark brown, smooth beans 3-4 mm long and broad.

Distribution and Flowering Season

Very local in sandscrub, central part of southern peninsular Florida; showy flowers (chasmogamous) produced mostly in May and June; cleistogamous flowers intermittently produced later in season.

Special Identifying Features

This Clitoria is distinguished from others of the southeastern area by its more consistently erect (versus viney) habit, its much narrower, usually lineal or oblong, leaflets, and particularly by the very long stipe of the ovary and fruit (in C. mariana, the southeastern species nearest it taxonomically, the stipe of the ripe fruit does not protrude beyond the calyx).

Habitat and Management Implications

C. fragrans consists now of a very few, scattered populations in the sandy scrublands of two counties in southern Florida. It is deeply rooted in deep, yellow or white, sands, the primary roots and branch roots much like very long, spatulate fingers. Most of the time it is found in sandy clearings in the scrub; sometimes it occurs in very open scrub. The overstory, where present, may be of scattered longleaf pine, slash pine or sand pine, these associated with both evergreen and deciduous scrub oaks, several ericaceous shrubs and a scattering of saw-palmetto. Associate herbaceous species on these dryish sites include Selaginella arenicola, many Dichanthelium Panicum, Cenchrus, Andropogon, Aristida, Stipa avenacea, Sporobolus junceus, Cyperus retrorsus, C. filiculmis, Bulbostylis warei, B. ciliatifolia, Helianthemum, several Lechea including L. patula, L. deckertii, L. divaricata,

Hypericum cumulicola, Paronychia chartacea, P. hernarioides, Polygonella basiramea, Pirequeta, Bonamia grandiflora, several Euphorbia, Opuntia, Ruellia, Eryngium cuneifolium, several composites mostly in Solidago, Liatris, Carphephorus, Aster, Heterotheca, Balduina angustifolia. Several species of rare shrubs, including Prunus geniculata, Conradina brevifolia, Calamintha ashei, Polygonella myriophylla, may abound locally, these and several of the herbs being typical of the now endangered flora of scrublands and sharing many of the same ecological quirks. The Clitoria and its associates were probably maintained by a combination of natural woods fires which tended to reduce woody plant competition, together with erosional forces, particularly wind, would would tend to create the sandy clearings favored by the Clitoria. Most of the scrub homeland of C. fragrans has been converted either to housing or to commercial property as the south Florida towns expand, or to orange groves. Such plants as this one do not seem to return quickly to abandoned farmland or to neglected orange groves. On the other hand, those areas of scrub that are still relatively intact (and they are few!) are now kept from fire and thus there is a shift in them toward an ever denser woody growth; this means that C. fragrans is losing ground even there! It should be considered endangered rather than threatened.

References

- Fantz, P. R. 1977. A revision of Clitoria (unpublished Ph.D. Thesis, University of Florida, Gainesville).
- Small, J. K. 1926. A new butterfly-pea from Florida (Clitoria fragrans). Torrey 26: 56-57.
- _____. 1933. Manual of the southeastern flora, pp. 721-722. Chapel Hill, N.C.

SPECIES Clitoria fragrans Small. Sweet-scented butterfly-pea

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Clitoria fragrans Small



JUNCACEAE

Juncus caesariensis Cov. New Jersey rush

Technical Description

Perennial scabrid rush, the culms solitary or tufted from a knotty rootstock, perennating from basal lateral offshoots.

Culms.--Erect or ascending, stiffish, terete, mostly 6-10 dm tall, multiribbed, the surfaces roughened by papillae and tubercles, thus dull pale green.

Leaves.--Alternate, the lowermost mostly broad, short scales, often persisting as fibrils, the foliage leaves scattered up the stem and gradually reduced in length, the larger ones lowest with sheathes cylindrical, to 10 cm long, slit from apex to near base on ventral side, there broadly scarious-margined distally and producing a pair of scarious, triangular, erect auricles ca. 3 mm high, the multi-ribbed, rounded backs scabrid as in the culms; leaf blades terete, narrowly lineal-cylindric, narrowly pointed, nodose-septate, 1-3 dm long, tuberculate-scabrid.

Inflorescence.--A compound of cymules, these on primary peduncles of various length that ascend from the upper nodes, the ultimate branches erect or spreading, the cymules head-like, hemispheric, few-to-many-flowered.

Flowers.--In small, simple or compound clusters 1.0-1.5 cm broad, subtended by chartaceous, smooth, triangular, acute to acuminate bractlets ca. 3-4 mm long; perianth tepaloid (all similar), the 6 segments narrowly triangular-subulate, 4-5 mm long, the inner cycle (petals) somewhat longer, rigid, greenish or with tints of pale brown, narrowly acute; stamens 6, shorter than the perianth, erect, the anthers basifixed; ovary superior, 3-carpellate, lance-ovoid, the body trigonous, the styles exserted, 3-branched.

Fruit.--Capsule ca. 5.0-5.5 mm long, somewhat exserted beyond the persistent perianth, lance-ovoid, the apex subulate, the surface a glossy red-brown; seeds numerous, a lustrous pale brown, narrowly fusiform, strongly bicaudate, ca. 2-3 mm long.

Distribution and Flowering Season

Sphagnum seep areas in swamps, boggy areas in flatwoods, ravines, Coastal Plain, southern New Jersey, eastern Maryland, eastern Virginia; flowering in July and August.

Special Identifying Features

J. caesariensis is most similar to J. canadensis, differing from it in having 6, rather than 3, stamens, but particularly in its conspicuously papillate-tuberculate foliage, this last feature an exclusive one for southeastern area Juncus of the complex

Habitat and Management Implications

This distinctive rush is always rooted in moist to wet, highly organic, acidic, usually sphagnum, substrate. Usually it is in sphagnum seeps in boggy flats in hardwood swamps or pine barrens, also seep slopes in ravines, thus its associates are primarily grasses and sedges, admixed with other rushes, *Xyris*, many *Rhexia*, *Lobelia*, *Aster*, *Solidago*, *Eupatorium* (particularly *E. dubium*, *E. maculatum*), *Vernonia*, etc. The Virginia localities are seeps and low rises in hardwood swamps or seep slopes in ravines. The swamps have cypress in the wettest areas, some loblolly pine on low rises, overall with many lowland oaks, including *Quercus lyrata*, *Q. michauxii*, *Q. phellos*, *Q. nigra*, *Q. shumardii*, *Q. hemisphaerica*, etc., *Magnolia virginiana*, *Ulmus*, *Populus heterophylla*, *Acer rubrum*, *Fraxinus pennsylvanica*, etc. The rush may be along sphagnum rivulets in the shade, but is usually most abundant in small clearings. These same small streams may drain into deep swamp, where *Fraxinus caroliniana*, *F. tomentosa*, *Salix*, *Populus*, *Nyssa* are abundant, but the *Juncus* there is replaced by other species, particularly *J. effusus*, many robust *Carex*, *Scirpus*, *Saururus*, *Typha*, etc. In the hillside seep areas the uplands are primarily oak-hickory-pine with an ericaceous understory, breaking down slope into mixed hardwoods (with much beech and maple) having a plenty of *Magnolia virginiana*, and an understory of *Vaccinium*, *Gaylussacia*, *Lyonia*, *Leucothoe*, deciduous *Rhododendron*, *Clethra alnifolia*, *Myrica*, *Alnus*. *J. caesariensis* is found where breaks in the overstory and thin spots in the understory allow enough sun to reach the seeps. Again, herbaceous associates are mostly grasses and sedges.

I have not seen *Juncus caesariensis* except in Virginia, the only state in the southeastern area it is known from. It may persist more abundantly in New Jersey, the state for which it is named, but the very specialized habitat makes this doubtful. In Maryland the one known area is presumed destroyed. In Virginia it is definitely rare with but three stations presently noted. Two of these are now being impacted adversely by a combination of such activities as residential lot construction, road building, chemical spraying of rights of way. Selective cutting of swamp species or of ravine slope species would probably not have an adverse effect providing mechanical disturbance of the wet substrate was not extreme.

References

- Coville, F. V. 1894. *Juncus caesariensis* Cov. (*J. asper* Engelm. non Sauze & Maillard) in Mem. Torr. Bot. Club 5: 106.
- Fernald, M. L. 1950. Gray's manual of botany, ed. 8, pp. 397-416. Boston, Mass.

SPECIES Juncus caesariensis Cov. New Jersey rush

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage						X		X
No Lasting Effect	X				X			
Beneficial if Done Properly								

Other Comments: site drainage would eliminate this species!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Juncus caesariensis Cov.



JUNCACEAE

Juncus georgianus Coville. Georgia rush

Technical Description

Densely tufted, diffuse-and-fibrous-rooted, smooth, perennial rush. Culms.--Erect or ascending, slender but stiffish, terete, strongly ribbed and grooved, pale green, mostly 2-4 dm tall, the bases often hidden by remnants of tufts of old leaves.

Leaves.--Crowded toward culm base, the outermost and lowest scale-like, the longest with overlapping sheaths from longer than to much shorter than the erect or spreading blades, their backs rounded, prominently ribbed, pale green, their involuted margins broad, white, subscarious, distally low-auricled; larger leaf blades 1/4-2/3 as long as the culms, narrowly linear, pale green, proximally flat, ca. 1 mm wide, the backs strongly ribbed, the upper surface shallowly concave, the margin a narrow, cartilaginous border, the tip narrowly tapering, half-terete.

Inflorescence.--Often 1/3-1/2 the total plant length, a cymose compound of secund racemes, the few primary branches of various lengths, usually dichotomously branched, the erect florets nearly sessile or on short pedicels, rather distant on the ultimate branches, the whole inflorescence longer than, and subtended by, 1-2 leaf-like, short-sheathed bracts, these bearing also in their axils narrowly triangular, scale-like, scarious-margined prophylls.

Flowers.--Individual flowers prophyllate, the lowest one subtending the pedicel, and (usually) two more directly under the perianth, scarious, broadly triangular, ca. 2 mm long, acute to rounded, sometimes apiculate or mucronate; perianth tepaloid, chaffy, the 6 segments erect, lance-subulate, ca. 4-6 mm long, broadly pale-scarious-margined, medially green with a narrow border of yellow or maroon; stamens 6, hypogynous, erect, the lineal, pale yellow, basifixed anthers much longer than the filaments; ovary superior, ovoid, ca. 3 mm long, green, smooth, the style reddish, ca. 1.0-1.5 mm long, the stigmas 3, linear, reddish, papillose.

Fruit.--Capsule oblong-ovoid, loculicidal, obscurely trigonous, ca. 3 mm long, lustrous, pale olivaceous, the numerous seed asymmetrically oblong, excentrically short-bicaudate, ca. 0.5 mm long, pale reddish-brown, irregularly longitudinally fine-ridged.

Distribution and Flowering Season

Moist sunny depressions on and around granite outcrops, Piedmont, from North Carolina south and southwest through South Carolina and Georgia into eastern Alabama. Flowering mostly from late May into late July.

Special Identifying Features

Of the e-septate-leaved, prophyllate Juncus in the southeastern area, J. georgianus is distinguished by its flat (in contrast to terete or strongly involuted) leaf blades, its shortish involucral bracts, its long (4-6 mm) flowers with the perianth segments very erect even in fruit.

Habitat and Management Implications

J. georgianus is locally abundant on granite outcrop areas, usually the tufts rooted in the shallow in-wash of edges of shallow pools. Herbaceous associates are such plants as Isoetes, Rhynchospora globularis (vars.), R. capitellata, Bulbostylis, Fimbristylis, Agrostis elliottiana, Cyperus granitophilus, Eleocharis tenuis, E. obtusa, Panicum flexile, P. lithophilum, various other Panicum, Diamorpha, Sedum, Arenaria species, Talinum, Gratiola, Lindernia monticola, L. anagallidea, Rhexia mariana, R. virginica, Utricularia cornuta, Viquiera, Oenothera fruticosa, Schoenolirion croceum, Senecio tomentosus, etc. The substrate is a highly organic sand, with the granitic substrate not far below, and the abundance of the herbaceous plants around the temporary pools is largely dependent on quantity of winter and early spring rainfall in that the summers are usually droughty. Slowly invading the granite are the surrounding, usually poor quality, stands of oaks such as Quercus georgianus, Q. stellata, Q. falcata, Q. nigra, Q. hemisphaerica, Q. montana, Q. rubra, Q. velutina, Q. marilandica, etc., Juniperus, Pinus virginiana, P. echinata, P. taeda, Diospyros, Ulmus alata, Prunus, Sassafras. As these invade, the herbaceous cover so characteristic of open granite glades disappears. This rush, together with its often rare and local associates, is endangered mostly by quarrying of the granite outcrops and to a lesser degree by development of some of these areas for residential lots or for public recreation. Increasing numbers of people are drawn to the larger outcrops, this often involving much needless trampling of granite pool vegetation or destructive driving over it by various recreational vehicles.

References

- Radford, A. E., C. R. Bell & H. E. Ahles. 1968. Manual of the vascular flora of the Carolinas, pp. 273-280. Chapel Hill, N.C.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 281-286. Chapel Hill, N.C.

SPECIES Juncus georgianus Coville. Georgia rush

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			NA	
Damage								X
No Lasting Effect	X							
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Juncus georgianus Coville



LAMIACEAE

Conradina glabra Shinn. panhandle rosemary

Technical Description

Aromatic, copiously branched, often clonal shrub to 2 meters tall from a woody, diffuse root.

Shoots.--Primary shoots usually several from the woody rootstock, spreading or ascending stiffly, toward base between 1 and 3 cm thick, subterete, the thin outer bark grayish or gray-brown, forming flat, anastomosing (braiding) strips, these often breaking and exfoliating; branchlets abundant, though usually more aggregated toward primary branch tips, slender but stiffish, spreading-ascending, quadrate, light gray-brown or light reddish-brown, minutely gland-dotted, also sometimes minutely and sparsely pilosulous.

Leaves.--Opposite, though appearing fasciculate because of presence of short shoots in axils, persistent, estipulate, linear (very similar to the needles of fir), the longer ones mostly 1.0-1.5 cm long, 1.0-1.5 mm wide, usually slightly and evenly widening from just above a basal constriction to the tip, thus generally linear-oblongate, apically obtuse, marginally strongly revolute, very short-petiolate, 1-nerved, the nerve strongly raised on the lower surface; upper surface deep yellow-green, glandular-punctate, the lower surface paler, minutely strigillose-tomentose.

Inflorescence.--Flowers solitary or (usually) 2 or 3 in spreading cymes from most upper leaf axils, the short (ca. 1 mm) glabrous peduncles apically bibracteate, the bracts green, linear-subulate, ca. 3 mm long, the pedicels slender, smooth, pale green or tinged with maroon, mostly 2-3 mm long.

Flowers.--Perfect, zygomorphic; calyx fused, bilabiate, 6-7 mm long, the tube cylindro-campanulate, ca. 3.5 mm long (to base of deepest sinus), apically pilose-annulate within, the limb bilabiate, the upper lip with 3, slightly upcurved, narrowly triangular, ciliate teeth and slightly shorter than the lower which is deeply cleft to 2 slenderly linear-triangular-subulate, upcurved, ciliate teeth, the calyx body strongly ribbed, gland-dotted, green or maroon-tinged; corolla from base to tip of longest lobe 1.5-2.0 cm long, strongly bilabiate; tube slenderly tubular, ca. 5 mm long, at its apex dilating and bent downward (geniculate) to form a funnelform throat ca. 5 mm long; upper lip oblong, somewhat hooded, arching upward and forward, lower lip flatter, longer, bent downward, strongly 3-lobed, the midlobe most prominent, usually obcordate; surface pilose externally the tube and lower part of the throat near white, deepening to lavender-blue at lobe and lip tips, this interrupted by a pale purple-dotted medial band on the inside of the lower lip; stamens 4, didynamous, paired toward apex of throat just below the lip sinuses, the slender whitish filaments ca. 1 cm long, arching upward under the upper corolla lip and projecting the short, horseshoe-shaped (ca. 0.7 mm long) villous-backed anthers well

beyond the corolla throat, the anther sacs parallel, the connective short, broad; ovary deeply 4-lobed, superior, the slender style exerted beyond the anthers, its tip bifurcated into 2 linear, acute, spreading, purplish-blue stigmas.

Fruit.--Nutlets 4 (usually but 2 perfecting), encased in the persistent calyx, broadly rounded-obovoid, slightly longer than 1 mm, pale reddish-brown, the surface faintly raised-reticulate with brown lines.

Distribution and Flowering Season

Sandy high pineland, very local, northwest Florida; flowering mainly from March into June, intermittently to frost.

Special Identifying Features

The genus Conradina is made up of but five species, all confined to the southeastern area, all shrubby in habit. Two (C. canescens, C. brevifolia) have cinereous-puberulent upper leaf surfaces and persistently puberulent pedicels. Of the three which have smooth upper leaf surfaces, C. glabra has the smoothest calyx tube, the palest corollas, the longest hairs on the anthers, and the most erect habit.

Habitat and Management Implications

C. glabra has developed a few, in some cases large, populations on the high sandy land east of the Apalachicola River below the town of Chattahoochee in Liberty County, Florida. Far to the west, in Santa Rosa County near Milton a single collection was made years ago but later efforts to relocate this population have not proved out. The Liberty County land was forested originally by either mixed hardwoods and pine, or by longleaf pine-deciduous scrub oak with occasional live oak in the uplands where the Conradina grew; these areas are deeply dissected by steep sided, densely forested, moist ravines in which presumably the Conradina did not and does not grow except in the ecotones. C. glabra was and is understory in open woodlands or in small clearings therein. Most of its original small area has been heavily logged, particularly for the longleaf pine, or has been cleared for agriculture. Crop farming is mostly poor in this area, but some former habitat is pastured woodland or has been cleared for pasture; in either event, the impact of clearing for crop farming has eliminated suitable habitat and pasturing badly damages the shrubs. The soil is a deep yellow sand, this overlying a conglomerate that has a high clay fraction which itself overlies limestone. In places, where there has been subsidence because of solution of underlying limestone, the

shallow, sandy swales that result, if not wet enough to develop bog vegetation, may support the Conradina. Associate shrub species that might be expected for this type are Chrysobalanus, Vaccinium, running oaks, Rhus toxicodendron, R. copallina, Crataegus, Rubus, Smilax, with dry site herbs such as many Desmodium and Lespedeza, Cassia, Baptisia (lanceolata, lecontei, simplicifolia), Lupinus (L. perennis, villosus), Phlox nivalis, P. floridana, Lithospermum caroliniense, Onosmodium virginianum, Berlandiera, many Heterotheca, Aster, Solidago, Liatris, etc., many Andropogon, Aristida, Digitaria, Panicum, Stipa, Sphenopholis, Cenchrus, Bulbostylis, Cyperus (upland species), etc. Much of the Conradina area, after the original harvesting of longleaf pine, has been planted to slash pine. In such cases C. glabra, along with Calamintha dentata, (its common associate) appears to be increasing in the plantation rows, but it may be premature to state that this will be a stable system in that (1.) the site is very poor for slash pine and the growth tends to be more open than may have been intended (2.) the plantations when older may provide more shade and more competition than is good for the Conradina. Since fire has been historical in the maintenance of stands of longleaf pine, and Conradina glabra was a part of these original stands, it is reasonable to assume that this shrubby mint is increased, not decreased, in the case of fire. Fire protection to favor the slash pine may be detrimental in the case of this shrubby mint.

References

- Gray, T. C. 1965. A monograph of the genus Conradina (Labiatae). Unpublished Ph.D. thesis, Vanderbilt University.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1166-1167. Chapel Hill, N. C.
- Shinners, L. H. 1962. Synopsis of Conradina (Labiatae). Sida 1 (2): 84-88.

SPECIES Conradina glabra Shinnery's panhandle rosemary

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy				X				
Damage		X	X					X
No Lasting Effect					X	X	?	
Beneficial if Done Properly	X							

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Conradina glabra Shinnery



LYTHRACEAE

Lythrum curtissii Fernald. Curtiss' lythrum

Technical Description

Subshrubby, smooth, perennial herb from a shallowly spreading, diffuse rootstock, the larger roots often spongy-thickened
Stems.--Solitary or in small clumps, bowed outward at base, but ascending or erect, the bark toward stem base thin, gray-brown or reddish-brown, cracking and anastomosing longitudinally to reveal paler inner bark, proximally terete, often spongy (if submersed), distally becoming quadrangular, narrowly winged, the lower part of the stem usually leafless by flowering time, the branching abundant from about the mid-stem up, slender, ascending, the lower branches often rebranched in the same way.

Leaves.--Numerous, alternate, subsessile, estipulate, ascending or spreading, those of main stem by far the largest, (but by flowering time usually deciduous from just below the inflorescence to stem base), mostly oblong to narrowly elliptic, acute, entire, mostly 1.5-3.0 cm long, the upper surface deep green or tinged with purple, the lower surface markedly paler, the principal venation pinnate, the lateral veins arcuate; leaves of branches and upper portion of main axis grading smaller, more numerous, alternate to subopposite, mostly ascending or erect.

Inflorescence.--Flowers borne singly in axils of most leaves of branches and upper axis on stiff, ascending pedicels rarely as long as 1 mm.

Flowers.--Somewhat zygomorphic, bisexual; calyx at anthesis forming a cylindro-clavate tube 3-4 mm long, this green with 10-12 purplish ribs and terminating in 4-6, low-triangular-subulate-tipped lobes, these alternating with narrow, spreading appendages from the sinuses; petals (4-) 6, distinct, arising and spreading from the calyx tube orifice, a lively lavender-rose, somewhat unequal, ca. 2 mm long, obovate to oblong or elliptic, acute at both ends; stamens mostly 6-12 of various lengths, the elongate, slender slightly flattened filaments arising from calyx tube base and extending well beyond its orifice, terminating in cinnamon, broadly ellipsoidal or oblong, versatile anthers ca. 0.4 mm long; ovary superior, short-cylindric, included in calyx, bicarpellate, terminating in a filiform, exserted, capitate stigma.

Fruit.--Capsule cylindro-clavate, ca. 3 mm long, smooth, pale reddish-brown, 2-loculed; seeds numerous, pale brown, oblong, concave-flattened, ca. 0.5 mm long.

Distribution and Flowering Season

Bogs, seeps, clearings in and edges of acid or calcareous swamps,

northern Florida and southwestern Georgia; flowering July into September or October.

Special Identifying Features

L. curtissii is most similar to L. alatum var. lanceolatum, and is nested within its range. It differs mainly in its smaller calyx tubes (4-5 mm versus 6-8 mm), its thinner, longer leaves of main stem, and its more remote rameal (branch) leaves.

Habitat and Management Implications

L. curtissii is a plant of high hydroperiod soils, usually silts, fine sands, or peat-muck. Its accepted range falls within the karst country of northwestern Florida and southwestern Georgia, where it may be found around the shallow ponds, in shallow boggy depressions in flatwoods, in roadside ditches, or in bays and river or creek swamps. Usually it is either in light shade or full sun, the surrounding overstory ranging from longleaf and slash pine with saw palmetto and gallberry in the understory to cypress-tupelo or titi. Sometimes it is at the edges of Hypericum ponds. In any event, the substrate is seasonally very wet. Commonest herbaceous associates are grass-sedge-rush, with an admixture of Xyris, Eriocaulon, Rhexia, Bacopa, Ludwigia, Polygala.

The greatest danger facing this very local species is the conversion of large parts of its former range to slash pine, this preceded by clearcutting, mechanical site preparation, and especially by cutting of drainage ditches. A permanent drying out of the site destroys L. curtissii even before crown closure of planted pine would shade it out. In such pine plantations the Lythrum persists only along these ditches.

References

- Fernald, M. L. 1902. Some little known plants from Florida and Georgia. Bot. Gaz. 33: 154-157.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 930-931. Chapel Hill, N.C.

SPECIES Lythrum curtissii Fernald. Curtiss' lythrum

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								
No Lasting Effect	X							
Beneficial if Done Properly					X	X		

Other Comments: drainage of this habitat is detrimental.

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Lythrum curtissii Fernald



LYTHRACEAE

Lythrum flagellare Shuttlw. lowland lythrum

Technical Description

Perennial, creeping, mat-forming, smooth herb.

Stems.--Older stems entirely prostrate, slender, wiry, dark brown, the thin bark cracking longitudinally, sometimes exfoliating; newer shoots ascending, arching or prostrate, wiry, quadrate, very narrowly winged, mostly leafy to the base.

Leaves.--Opposite, estipulate, simple, spreading and often upright (thus appearing secund) on reddish petioles 1.5 mm long or less, or sessile, the blades oblong to elliptic or even suborbicular (these usually the lowest ones on a shoot), mostly 0.7-1.3 cm long, apically rounded or obtuse-angled, the margin entire, glassy-papillate, the base rounded or broadly cuneate, the surfaces uniformly green, only the midnerve evident.

Flowers.--Solitary in the axils of most shoot leaves, with ascending, clavate, short pedicels slightly longer than subtending petioles, bearing at apex just below the flower 1-2 lanceolate-acute, scale-like bracteoles ca. 1 mm long; calyx tube cylindro-clavate, at anthesis ca. 4 mm long, the 5-6 lobes triangular, ca. 1 mm long, alternating at rim with 5-6 triangular-subulate appendages nearly as long, the tube surface greenish, tinged with maroon, the midnerve of the calyx lobes decurrent as narrow ribs; petals distinct, equalling sepals, bright lavender, obovate, ca. 5 mm long, broadly rounded or slightly retuse, entire, cuneate; stamens equal to or more than the sepals, arising at different levels in the calyx tube, the slender, deep lavender filaments thrusting the ellipsoidal dorsifixed anthers beyond the calyx mouth; ovary superior, oblong, ca. 3 mm long, the style terminal, erect, terminating in a capitate stigma at about the mouth of the calyx.

Fruit.--Capsule ca. 3-4 mm long, ellipsoidal-cylindrical, smooth, pale brown, bilocular, the seeds numerous, reticulate.

Distribution and Flowering Season

Margins of ponds, ditchbanks, edges of cypress swamps, southern peninsular Florida; flowering all year.

Special Identifying Features

L. flagellare is the only lythrum of the southeastern area to have an almost exclusively creeping-stoloniferous habit. Leaf length/width ratios are lower than in any other southeastern species.

Habitat and Management Implications

L. flagellare is confined to mucky or sandy-peat-muck soils, thus is a plant of high hydroperiod systems. Its best habitat is in the intermittently inundated margins of shallow pineland sloughs or at edges of cypress domes. These types in south Florida may be seasonally dry but over most of the normal year are distinctly wet. The pine flatwoods are usually slash pine, with an understory of saw palmetto interspersed with Myrica, Ilex and ericaceous shrubs, all growing not far above underlying calcareous rock. During the dry periods these areas frequently burn, this promoting a savanna formation composed of grass-sedge with other monocots such as Eriocaulon, Xyris, Juncus, Sagittaria and dicots in general Utricularia, Sabatia, Polygala, Lippia, Hydrocotyle, Ludwigia, Mecardonia, Lindernia, Campanula, Lobelia, Buchnera, Proserpinaca, Rhexia, with wetland representatives of Liatris, Coreopsis, Carphephorus, Bigelowia. Most collections of L. flagellare come from the flatwoods and cypress dome borders of a zone along the Florida gulf coast from Sarasota southward, and much of this same region was ranch country between the major towns (i.e. Sarasota to Punta Gorda, Punta Gorda to Ft. Myers and south) where the flatwoods savannas continued to be burned as they were historically. In more recent years these same tracts have been drained increasingly, this resulting in a reduction of the shallow wetlands habitat supporting the Lythrum. Much former habitat is now uniformly dry except during wettest periods and the plants are now mainly to be looked for only along drainage ditches. L. flagellare, it appears, is another fire-related species of wet savanna and will not persist where woody plants, protected from occasional fire, increase or where the substrate is dried out by construction of drainage ditches.

References

- Chapman, A. W. 1897. Flora of the southern states, ed. 3, p. 158. Cambridge, Mass.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 930-931. Chapel Hill, N. C.

SPECIES Lythrum flagellare Shuttlw. lowland lythrum

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: drainage of habitat is detrimental!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Lythrum flagellare Shuttlw.



MAGNOLIACEAE

Magnolia ashei Weatherby. Ashe magnolia

Technical Description

A small tree or large shrub, and rarely to 30 ft. tall, the trunk single, ascending, rarely straight, or trunks several and spreading-ascending from a common root.

Bark.--Beechlike, from a short distance appearing smooth, grayish or pale gray-brown, close up minutely warty-roughened, thin, on oldest specimens sometimes checking.

Twigs.--Stoutish, the new shoots frequently to 1 cm thick, terete, gray-green, sericeous with short, appressed, silvery hairs, the leaf scars nearly round, bundle traces numerous, the stipule scars girdling the shoot; terminal bud (usually containing a flower) lance cylindric, conic-tipped, fully 4-6 cm long, densely appressed-silvery-tomentose.

Leaves.--Conspicuously large, frequently 6-7 dm long, those of a season frequently rather crowded in close spirals toward shoot tips, ascending to spreading on stoutish terete, appressed-white-tomentose petioles 5-9 cm long, the blades obovate, the abruptly narrowed tip narrowly rounded or emarginate, the margin entire, crispate-undulate, the base evidently auriculate, the upper leaf surface deep green, at maturity smooth, the lower surface very glaucous, chalk-white with appressed and spreading-villous hairs.

Flowers.--Solitary at tips of expanding shoots, usually approaching anthesis shortly after subtending leaves have begun to harden in late spring, symmetrical, bisexual, the receptacle very elevated, cylindric; perianth segments mostly 6, seemingly in 2 sets, mostly oblong-obovate, rather fleshy, creamy-white with purplish-red blotches toward their bases, at first erect with tips only spreading, forming a fragrant "tulip" fully 1 dm high, later spreading into a flower fully between 2 and 3 dm broad, soon thereafter abscissing; stamens numerous, spirally arranged, the short filaments erect, the connective broad, cream, the yellowish anther sacs linear; carpels numerous, distinct, spirally arranged, whitish-puberulent, the stigmas linear, lateral on the excurved styles.

Fruit.--A conelike, subcylindric aggregate 5-7 cm long, ca. 3-4 cm thick of woody, short-beaked follicles ca. 1.3-2.0 cm long, externally roseate at first maturity, later becoming brownish, splitting along 1 line, revealing bright red, slightly laterally flattened, bean-shaped seed, these dangling out on long funicular strands.

Distribution and Flowering Season

Ravines in hardwood forests or in oak-pine hills, western Florida from Leon to Walton Counties; flowering in April and May.

Special Identifying Features

Magnolia ashei is thought by some to be merely a variant of M. macrophylla, a taller taxon with a much wider range, and which has a rounder, often shorter, definitely broader aggregate of follicles. Dr. R. K. Godfrey, an authority on trees of northern Florida, states (1962) that M. macrophylla does not occur in Florida. If, as is now believed, the early report of M. ashei from eastern Texas is based on M. macrophylla, M. ashei is indeed a geographically distinct entity.

Habitat and Management Implications

M. ashei is rooted in the moist sandy loams of ravine slopes and narrow creek bottoms of western Florida. Associate species are mesophytic and include M. grandiflora, M. virginiana, Persea, Acer barbatum, A. leucoderme, Illicium floridanum, Fagus, various willow oaks, Asimina parviflora, Ilex, Halesia, etc. Pines such as P. taeda, P. glabra may be frequent in the overstory.

Such ravines often have trees of high value and many within the narrow range of M. ashei have been logged heavily, usually clearcut. These kinds of operations, usually involving tractors and other heavy equipment, if they do not kill the scattered magnolias outright by breaking or otherwise damaging crowns and roots, create openings, increase soil erosion, and in general reduce the quality of the site for M. ashei, which seems to be an obligate understory species. Therefore it generally gives way to weedier species over time. In short, this species (or variety?) is in considerable danger.

References

- Kurz, H. & R. K. Godfrey. 1962. Trees of northern Florida. Univ. of Florida Press, Gainesville.
- Miller, R. F. 1975. The deciduous magnolias of west Florida. *Rhodora* 77: 64-75.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 535-536. Chapel Hill, N. C.
- Weatherby, C. A. 1926. A new magnolia from west Florida. *Rhodora* 28: 35-36.

SPECIES Magnolia ashei Weatherby. Ashe magnolia

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	X	X	X		X	X	
Damage					X			X
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Magnolia ashei Weatherby



MALVACEAE

Callirhoe papaver (Cav.) Gray var. bushii (Fern.) Waterf.
Bush's woods poppy-mallow

C. bushii Fern.

C. involucrata (T. & G.) Gray var. bushii (Fern.) Martin

Technical Description

Perennial herbs from carrot-like rootstocks.

Stems.--Stems solitary or few, erect or ascending or sprawling, mostly 5-8 dm tall, terete or (distally) subangulate, proximally purplish-tinged, distally pale green, simple to above the middle or sparingly branched from near base, the branches ascending, the surfaces with a scattering of appressed, stellate trichomes and, toward stem base these admixed with spreading or reflexed pilosity.

Leaves.--Both basal and cauline, alternate, stipulate, the rosette and lower stem leaves usually drying by anthesis, strongly petiolate, those at about mid-stem or just below it the largest; stipules ovate-triangular or narrowly ovate, acute, mostly 1-2 cm long, entire or sparsely toothed toward apex, strumose-hirsute marginally, the bases clasping, the lower surface sometimes puberulent; petioles much longer than blades on lower leaves, progressively shortening upward on stem, ascending, slender but stiff, hirsute; blades suborbicular to broadly ovate or reniform, 5-8 cm long, 5-10 cm wide, deeply and palmately lobed and parted into from 3-7 oblong to cuneate, rarely narrowly triangular, segments, these ascending-toothed from above the middle to the acute segment apex, the sharp-based sinuses cutting 1/2-2/3 of the way to the leaf base, which ranges from truncate to broadly or narrowly cordate; upper leaf surface deep yellow-green, pilose-hirsute, the lower surface somewhat paler, pilose-hirsute.

Inflorescence.---Flowers usually few per branch, loosely racemose, axillary to uppermost leaves, the peduncles 1-flowered, erect to ascending, at first barely longer than the flowers, in fruit elongating to ca. 1 dm, hirsute-and-stellate-hairy.

Flowers.--Regular, perfect, showy, each subtended by an involucre of 3, lance-linear to ovate, green, strumose-ciliate, upcurved bracts 1.0-1.5 cm long; sepals 5, green, united at base into a broadly campanulate cup 6-7 mm high, the lobes linear-triangular, to 2 cm long, slenderly tapering-tipped, the margins coarsely strumose-hirsute, the surface externally hirsute from lobe base to base of calyx, internally villosulous-tomentose; petals 5, joined at very base, ascending-spreading, a lively pale rose-purple, paler toward base, broadly obovate, 3.0-3.5 cm long, apically broadly rounded or truncate, erose, the short-clawed base internally pilose; stamens numerous, monodelphous, the staminal tube plus the free filaments and anthers ca. 1.5-2.0 cm long, the tiny anthers dorsifixed, yellow; carpels 10-20, forming a ring, the style parting above its base into a like number of linear branches, these narrowly stigmatic on the inner side.

Fruit.--Dry, the mature carpel becoming a firmly papery-walled (chartaceous) mericarp, these arranged in a ring around the center of the receptacle, each shaped much like the segment of an orange or tangerine, ca. 4 mm long, apically short-pointed, the backs coarsely raised-reticulate, 3-nerved, subapically bidentate with narrowly triangular teeth, the sides flat, peripherally rugose-reticulate, the attachment toward the base of the narrow inner angle; seeds reniform, ca. 3 mm long, somewhat laterally flattened, 1/mericarp.

Distribution and Flowering Season

Dryish, rocky open woodlands or glades, southwestern Missouri, northwestern Arkansas, eastern Oklahoma. Flowering from May into August.

Special Identifying Features

The species C. papaver is distinguished from other lobed-leaved sympatric Callirhoe by its combination of erect habit, pseudocalyx of 3 subfloral bractlets, deeply colored petals and conspicuous stipules. The nearest species to it is C. involucrata, which has procumbent or decumbent stems, and leaf divisions that are coarsely serrate. Var. bushii is distinguished from C. papaver proper by the spreading or retrorse, longer stem hairs, often by the broader leaf segments, these few-toothed toward the apex.

Habitat and Management Implications

C. papaver bushii is found in open calcareous or cherty-rocky woodlands, rocky banks and bluffs of ravines and streams, or at edges of limestone glades and barrens. Its tuberous rootstocks are usually rooted in clay. Overstory species in the area are characteristic of ozarkian uplands, namely Quercus alba, Q. stellata, Q. muhlenbergii, Q. rubra, Q. velutina, etc., Carya tomentosa, C. texana, C. glabra, C. ovalis, Ulmus rubra, U. americana, U. alata, Fraxinus americana, Acer saccharum, etc. Stands of juniper are common, pure or admixed with the hardwoods. Shrubs such as Rhamnus caroliniana, Rhus aromatica, Cornus, Andrachne, Hypericum are often present. Herbaceous associates include Delphinium, Arenaria, Sedum, Onosmodium, Talinum, Oenothera, Satureja, etc. in the more open areas, mostly indicators of rather basic soils.

The upland system into which this variety fits is being radically changed. Several of the major streams have been dammed, flooding out much of the bluff, dry bank, and glade habitat; expansion of the small towns in this region of heavy tourism has resulted in the loss of still more area as residential and recreational development moves outward. Much of the forest has been cut or poisoned away, so as to open up the rocky woodlands or so as totally to clear for pasture. Thus, with such a recent and

drastic alteration of much of the former habitat of this attractive plant, it should indeed be considered threatened.

References

- Martin, R. F. 1938. Miscellaneous notes on U. S. plants. *Rhodora* 40: 459-461.
- Robinson, B. L. & M. L. Fernald. 1909. Emendations of Gray's manual I. *Rhodora* 11: 33-61.
- Steyermark, J. A. 1963. Flora of Missouri, pp. 1048-1051. Ames, Iowa.
- Waterfall, U. T. 1959. C. papaver (Cav.) Gray var. bushii (Fern.) Waterfall, comb. nov. *Southwestern Nat.* 3: 215-216.

SPECIES Callirhoe papaver (Cav.) Gray var. bushii (Fern.) Waterf.

Bush's woods poppy-mallow

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Callirhoe papaver (Cav.) Gray var.
bushii (Fern.) Waterf.



NYMPHACEAE

Nuphar luteum (L.) Sibth. & Sm. ssp. ulvaceum (Miller & Standl.) Beal. West Florida cowlily

Nymphaea ulvacea Miller & Standl.

Nuphar ulvaceum (Miller & Standl.) Standl.

Technical Description

Coarse, smooth, aquatic perennial, the leaves arising directly from a stout, submersed, shallowly set, elongate rhizome to 5 cm thick.

Leaves.--Alternate, on variously elongate (depending on water depth) terete, spongy, green petioles to 1 meter long (usually less); submersed blades thin, the entire margins strongly undulate-crispate, often tinged with red; floating leaves similar to submersed ones but thicker, deeper green, flat, lance-ovate to lance-oblong, mostly 2-4 dm long, the tips narrowly rounded, the margin entire, the auriculate base with lobes overlapping or closing the narrow sinus, this less than 1/5 the blade length; upper leaf surface lustrous, deeper green than the duller lower surface.

Flowers.--Solitary at tips of fleshy bractless peduncles that arise directly from the rhizome and are similar in length and shape to petioles of subtending leaves, regular, perfect, subglobose, ca. 2.5 cm high, 3.5-4.0 cm broad; sepals 6 in 2 apparent series, the outer 3 erect, broadly oblong, cupuliform, green, ca. 3 cm long, the tips broadly rounded, the base abruptly constricted at the receptacle; inner sepals clear yellow, thinner, rounded-obovate, short-clawed, cupping the center of the flower; stamens numerous, incurved-overlapping in 4-5 flat spirals, yellow, the flattened filaments shorter than the linear upright anthers; ovary superior, at anthesis ca. 2 cm high, the many carpels fused into a broadly ovoid-globose body, this constricted just below the apex, then abruptly dilated, forming a concave disc, 1.2-1.5 cm broad, the numerous narrowly elliptical stigmatic lines radiating spokelike from the center.

Fruit.--A green, subglobose, spongy berry ca. 2.5 cm high, the apex truncated by a persistent stigmatic disc, the numerous seeds imbedded in spongy placental tissue, round, ca. 4 mm broad, smooth, pale brown.

Distribution and Flowering Season

Swiftly to slowly flowing shallows of streams, northwestern Florida, Chipola system westward; flowering intermittently from May to frost.

Special Identifying Features

This subspecies (according to Beal all are subspecies of N. ulvaceum!) is, in its narrow floating leaves, most similar to ssp. sagittifolia,

a taxon of the Atlantic Coastal Plain, but tends to have broader foliage. It is also supposed to be distinguished from it by the pattern of its stigmatic rays (lines) which is narrowly elliptic (rather than linear). Differences between these subspecies are best consulted on plants which are in normal depths and currents of water, the narrower leaved ones appearing it seems where currents are swiftest. When specimens of *N. luteum* ssp. *ulvaceum* are exposed, as when the river level drops for long periods, the leaves become much shorter-petioled, with blades having much lower length/width ratios. On the other hand, submersed leaves also tend to have blades with lower length/width ratios.

Habitat and Management Implications

N. luteum ulvaceum has its rhizomes shallow embedded in the sands or silty sands of bottoms and shallows of swift flowing, clear or tannic-acid-tinted streams. Here it may be associated with various *Potamogeton*, *Najas*, *Sparganium*, *Scirpus* (such as *S. etuberculatus*), *Sagittaria*, etc. At low river stages it may be exposed or in very shallow water and reacts to produce much different looking plants (see previous section!) The bank forests are typical of bottoms in the region, containing a mixture of *Planera*, *Forestiera*, *Ulmus*, *Salix*, willow oaks, Sycamore, *Carya aquatica*, *Nyssa*, *Taxodium*, *Acer rubrum*, etc. Much of this timber is valuable and considerable acerages of bottomland forest in the range of this *Nuphar* have been cut over. The threat to the *Nuphar* is predictable; clearcutting of the hardwoods alters the drainage pattern, promotes excessive flooding, excessive sedimentation, reduces water quality and clarity, all negative factors for this plant. Single tree or groups selection, providing the logging is done with minimal disturbance to the substrate, probably has the least effect.

References

- Beal, O. E. 1956. A taxonomic revision of the genus *Nuphar* Sm. of North America and Europe. Journ. Elisha Mitchell Sci. Soc. 72: 317-346.
- Fernald, M. L. 1942. Additions to the flora of Virginia. Rhodora 44: 396-397.
- Miller, G. S. & P. C. Standley. 1912. The north American species of *Nymphaea*. Contribs. U. S. Nat. Herb. 16 (3): 63-108.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 540-542. Chapel Hill, N. C.

SPECIES Nuphar lutea (L.) Sibth. ssp. ulvaceum (Miller & Standl.)

Beal. West Florida cowlily

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	X*	X*	X*		X	NA	
Damage								X
No Lasting Effect					X			
Beneficial if Done Properly								

Other Comments:* referring to adjacent bottoms

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Nuphar luteum (L.) Sibth. & Sm. ssp. ulvaceum (Miller
& Standl.) Beal



OLEACEAE

Chionanthus pygmaeus Small. Pygmy fringe-tree

Technical Description

Shrub or small tree to ca. 15 feet tall, the bark gray-brown, thinnish, longitudinally cracking.

Twigs.--Opposite or subopposite, stiffish, grayish or gray-brown, on newer shoots often with 4 low ribs along the internodes below the sides of the semicircular, concave leaf scars; leaf scars mostly opposite, sometimes alternate; terminal bud ovate-triangular, ca. 4 mm long, the several scales imbricate, reddish-brown, ciliate; axillary buds similar but smaller.

Leaves.--Opposite or alternate, estipulate, simple, spreading or ascending, mostly 3-10 cm long, the petioles short, the blades somewhat leathery, ovate to elliptic or obovate, acute to rounded, entire, attenuated to the petiole, the upper surface dark yellow-green, smooth, the lower surface paler, glabrescent (becoming smooth), reticulate.

Inflorescence.--Showy, appearing with the new shoots from the axils of most leaf scars of the previous season, a leafy-bracted panicle, the larger bracts opposite, spreading or ascending, mostly elliptic or oblong, becoming similar to but smaller than foliage leaves, proximally on the axis, but reduced upward in the inflorescence to linear, 3-4 mm long, the peduncle rather short, its opposite branches numerous, spreading, slender, drooping, terminating in 3-6-flowered cymes, the whole inflorescence multiflowered and feathery.

Flowers.--Regular, perfect, very pleasingly fragrant; sepals 4, green, ca. 1.5-2.0 mm long, united at base, the lobes triangular; petals 4, white, united at base to a short, campanulate throat, the lobes narrowly linear, 1.0-1.5 cm long, somewhat spreading, stamens 2, opposite, adnate to corolla base and falling with it, the erect greenish filaments ca. 2 mm long, the yellowish basifixed anthers oblong, blunt-tipped, ca. 2 mm long; ovary superior, ovoid, slightly over 1 mm long, the single erect, terminal style somewhat shorter, apically with a bilobed stigma.

Fruit.--Drupes 2.0-2.5 cm long, oval, green becoming purplish-brown when ripe.

Distribution and Flowering Season

Sandhills and sandy scrub, lakes region of southern central peninsular Florida; flowering from March into April.

Special Identifying Features

If this is a species it shares the southeastern area with but one

other of the genus, namely the common fringetree C. virginicus L. which does occur in northern and middle peninsular Florida. However, this last often becomes a small tree whose leaves are thinner, whose petals are longer (mostly with lobes 2-4 cm long), whose anthers have apiculate or acuminate tips, and whose fruit is seldom as large. C. pygmaeus, as is so often the case with woody plants in sandhills, often looks shrubbier than it really is, in that blowing, drifting sands build up around it to the point that only the upper branches are exposed.

Habitat and Management Implications

This rare woody plant is confined to the deep, yellow or white sands of the peninsular Florida scrub. Usually it is on sandhills, either under longleaf pine-deciduous scrub oak or in the denser growth of the sand pine-evergreen oak type. In the latter type, if the sands have become stabilized by the various scrub species, its growth may become quite spindly and elongated, thus plants may reach as much as 15 feet. In the more exposed sites it is much more compact, lower, shrubby. Common associates in the sandscrub are Quercus myrtifolia, Q. chapmanii, Q. geminata, Carya floridana, Persea humilis, Lyonia ferruginea, Ilex ambigua, Bumelia tenax, Garberia, Ximinea, Osmanthus megacarpa, Ceratiola, etc. The scrub has had a long history of fire, some of the severe ones burning such plants back to the base, eliminating such as Ceratiola. However, most sandhills species are biologically adapted to fire, many sprouting vigorously afterward. The sparse overstory of pines has been cut or burned often and, in that most understory woody species of shrubs or small trees are less dense or absent from dense stands of pine in the overstory, it is assumed that reduction of the overstory favors increase of such species as C. pygmaeus.

The main problem with C. pygmaeus is not from the fire or logging, but instead is the "suitability" of the sandhills for cultivation of orange trees which now occupy the bulk of the former range of this showy rarity. Also, much of the scrub has been converted to housing lots for the rapidly expanding towns and communities of the south Florida highlands. It is suggested, in fact, that the status of C. pygmaeus be changed from "threatened" to "endangered".

References

- Hardin, J. W. 1974. Studies of the southeastern United States flora. IV. Oleaceae. Sida 5: 274-285.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1041-1042. Chapel Hill, N. C.

SPECIES Chionanthus pygmaeus Small. pygmy fringe-tree

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								
No Lasting Effect	X							
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Chionanthus pygmaeus Small



POACEAE

Ctenium floridanum (Hitchc.) Hitchc. Florida orange-grass
Campulosus floridanus Hitchc.

Technical Description

Perennial grass from scaly rhizomes.

Culms.--Solitary or clumped, terete, slender and wand-like, to 1.5 meters tall, proximally smooth, distally scabro-puberulent or cinereous.

Leaves.--Rhizomal leaves tightly overlapping, scale-like, scarious-margined, straw-colored; basal leaves crowded, the sheathes open and strongly overlapping, the lowermost ones short-bladed and grading into rhizomal ones, the uppermost ones becoming greener, often tinged with maroon and with narrowly linear, green blades 5-30 cm long, mostly 3-5 mm wide, frequently involute, strongly multiverved, the upper surface scabro-puberulent on the nerves; ligule a narrowly triangular, pale, scarious, acute, lacerate-fimbriate scale to 5 mm long; mid-and-upper culm leaves few, scattered, the sheathes shorter than the internodes and closed proximally, the blades shorter, narrower and more involute than those of culm base.

Inflorescence.--Spikelets unilateral in a terminal spike, numerous, close-set, sessile, alternating in 2 rows along the concave side of and perpendicular to a single, slender, slightly excurved, greenish-purple, convex-backed spike rachis 4-15 cm long, this sometimes also spiralled, the whole inflorescence laterally quite flattened, when viewed from the side resembling a narrow comb, with reduced spikelets narrowing it at each end. First glume narrowly triangular, 1.5-2.0 mm long, scarious, keeled, the single nerve excentric, greenish, scaberulous, the glume base dorsally with a conspicuous, spongy, pulvinar swelling; second glume lanceolate, narrowly acute, 4-5 mm long, scarious with 3 strong (but not complete) longitudinal green nerves, the median one bearing midway up an excentrically spreading, rigid, swollen-based awn 3-4 mm long, the lateral ones bearing (or lacking) a scattered row of inconspicuous, yellowish glands; rachilla base (callus) bearing a strong tuft of slender, erect, white bristles; first lemma empty, scarious, ca. 3 mm long, oblong-elliptic, the apex emarginate, the single green nerve dorsal, excurrent as a straight awn, the edges plumose-ciliate; second lemma staminate or empty, similar in awning and shape to the first, but ca. 3.5 mm long and containing a slender, reduced linear palea 2.5 mm long; 3rd lemma like the others, the body ca. 3.5 mm long and similarly awned, the palea nearly as long, apically bifid; additional lemmas 2 or 3, reduced, subtended by a rachilla joint ca. 1 mm long.

Fruit.--Grain narrowly cylindrical, dark brown, ca. 2 mm long,

Distribution and Flowering Season

Sandy, moist to quite dry ecotones between longleaf pine scrub or wiregrass, and pine flatwoods ponds or depressions, northern peninsular Florida north into southeastern Georgia; flowering and fruiting from August to frost.

Special Identifying Features

Of the 12 species in this small genus only two are native to the U.S.A. and C. floridanum is nested into but a small part of the range of C. aromaticum, which is widespread in savannas and flatwoods clearings in the Coastal Plain from Virginia south to Florida and west into Louisiana. The two are easily distinguished in that the former blooms and fruits later in the year, has prominent scaly rhizomes (lacking in C. aromaticum, a much more tufted plant), has a much longer ligule, takes a generally drier habitat, and either has less prominent glands along the midrib of the 2nd glume or lacks these glands entirely.

Habitat and Management Implications

C. floridanum appears to take a distinctly drier habitat than does C. aromaticum, and rarely dominates its landscape. The plants are generally scattered in savanna-like sites on dryish sandy soils and are in association with several species of upland Aristida (mainly A. stricta), Andropogon, Sporobolus, Anthaenantia villosa, Digitaria villosa, many Dichanthelium, Panicum, Heterotheca (gossypina, microcephala, scabrella, etc.), Helianthus floridanus, Liatris gracilis, L. tenuifolia, Agalinis setacea, etc. It is usually in what appears to be a transitional zone between longleaf pine-turkey oak scrub, or live oak-pine savanna and pine-saw palmetto-gallberry flats or pineland ponds. In the same parts of Florida and Georgia, C. aromaticum occupies a distinctly wetter habitat, being particularly abundant on the black sandy peat of pineland savanna or even in bogs.

Much of the habitat of C. floridanum is being destroyed through residential-industrial developments on the one hand, and through mechanical site preparation for plantation pine on the other. This grass was probably maintained in nature by periodic natural woods fires which would have tended to reduce competition by woody plants, favoring the dryish savanna systems.

References

Hitchcock, A. S. 1915. New or noteworthy grasses. Am. Journ. Bot. 2: 306-307.

_____. & Agnes Chase. 1950. Manual of the grasses of the United States, ed. 2, pp. 515-516. U.S.D.A. Misc. Publ.

no. 220, Washington, D.C.

Small, J. K. 1933. Manual of the southeastern flora, p. 114.
Chapel Hill, N. C.

SPECIES Ctenium floridanum (Hitchc.) Hitchc. Florida orangegrass

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X		X			X	X
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Ctenium floridanum (Hitchc.) Hitchc.



POACEAE

Panicum hirstii Swallen. Hirst's panic-grass

Technical Description

Perennial grass in sect. Dichanthelium, the culms usually in small tufts from overwintering rosettes.

Culms.--Erect or leaning, slender, to 8 dm tall, longitudinally ribbed, smooth, at mid-culm with internodes longer than subtending sheaths.

Leaves.--Rosette leaves spreading, broadly lance-linear, acuminate, mostly 3-4 cm long, smooth, strongly nerved, the margins thin; culm leaves several, gradually reduced in length from ca. mid-culm both upward and downward on culm, narrowly lance-linear-bladed, the sheathes mostly shorter than internodes, purplish-tinged, strongly ribbed, smooth, save for the pilose margins, the longest blades mostly 8-14 cm long, smooth, in the vernal culms flattish, inrolled only toward the narrowed tips, in the autumnal culms strongly inrolled, always erect or ascending, firm.

Inflorescence.--Spikelets several to very many in a panicle, this 3-7 cm long, in outline narrowly elliptical, the numerous panicle branches thus strongly ascending, all branches smooth, the primary ones sinuously contorted, the stiffish, ascending lateral peduncles shorter than the spikelets, mostly secund (unilateral on branches),

Spikelets.--Narrowly to broadly obovoid, ca. 2 mm long, asymmetrical, often obpyriform, strongly ribbed, smooth (or pilosulous), pale green, bluntish; first glume scarious, pale, broadly rounded or obtuse, nerveless, 0.5-0.8 mm long; second glume about as long as the fertile lemma, toward its tip often purple-tinged; sterile lemma slightly longer than the fertile (thus ca. 2 mm long), otherwise similar to the second glume; fertile lemma with a short, incurved, hispidulous point, the strongly convex back whitish, shining, minutely and distantly papillate.

Distribution and Flowering Season

Wet savanna and pine barren ponds, Coastal Plain, southern New Jersey and southwestern Georgia. Vernal culms in May, June; autumnal culms from August to frost.

Special Identifying Features

This Dichanthelium Panicum is placed in the Sect. "Angustifolia" on the basis of the stiffish, erect, narrow blades which tend to taper from near base to apex, the obpyriform, conspicuously

or inconspicuously pustular spikelet which is usually strongly nerved and blunt-tipped, and the bushy-branched (distally) autumnal habit. Tentatively, R. Harper placed it in P. roanokense on the basis of small spikelets, smooth foliage, smooth nodes, which thus means he interpreted it as being in Sect. "Dichotoma", but the inflorescence branching in P. hirstii forms a narrower system. Greatest difficulty comes with P. neuranthum Griseb., which in no way differs from the type description or the type material other than in the spikelet being "finely papillose-pubescent". P. neuranthum is found mostly in wet savanna, edges of islands in everglades, moist open swales, in Cuba, British Honduras, southern Florida northward locally to southern Alabama, southern Mississippi and Texas. In that there are frequent instances of species of "Dichanthelium" varying widely from smooth to pubescent in spikelet, it would seem to me that P. hirstii is certainly a weak species and probably is a glabrous variant of P. neuranthum Griseb. This last, by Gould and overconservatively, has been placed in the synonymy of Dichanthelium angustifolium (Ell.) Gould.

Habitat and Management Implications

Panicum hirstii, if it is a species, is found in areas that are at least intermittently wet, usually in full sun or light shade. It is to be looked for around and in shallow, intermittent or fluctuating pineland ponds, the plants rooted in sandy-peat-muck and mostly associated with grass-sedge bog species. These systems frequently burn or are burned over during dry cycles, and this is probably a significant management factor in keeping woody reproduction from closing over the herbaceous cover and shading or crowding it out. The forest overstory around P. hirstii ponds in southwest Georgia is primarily Taxodium-Nyssa, with varying admixtures of Pinus serotina, P. palustris, P. elliotii, Acer rubrum, Fraxinus (in southern New Jersey Taxodium is absent but Chamaecyparis present, and the dominant Pinus is P. rigida). Management to protect P. hirstii would have to exclude drainage, excessive soil disturbance including any methods of mechanical site preparation. Controlled burning would favor the species.

References

- Gould, F. W. 1975. The grasses of Texas. College Station, Texas.
- Hitchcock, A. S. & Agnes Chase. 1950. Manual of the grasses of the United States. U.S. Govt. Printing Office, Washington.
- Swallen, J. R. 1961. A new species of Panicum from New Jersey. Rhodora 63 (752): 235-236.

SPECIES Panicum hirstii Swallen. Hirst's panic-grass

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: drainage of habitat would be detrimental!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Panicum hirstii Swallen



POACEAE

Panicum lithophilum Swallen. Swallen's panic-grass

Technical Description

Annual, often tufted, panic-grass with a shallow, diffuse root system.

Culms.--Highly variable in height, depending on fertility of site, moisture, ranging from 1.5-6.0 dm tall, few-to-several per clump, erect to ascending or spreading, slender, teretish, low-ribbed, purplish-tinted proximally, pilose at the nodes.

Leaves.--Concentrated toward the culm base, but none forming overwintering rosettes, the lowest smallest, usually withered by flowering time, the largest with sheathes 3-4 cm long, these narrowly tubular, strongly ribbed, pilose, with hair bases on ribs strumose, splitting apically; ligule a ring of hairs ca. 3-4 mm long; blades ascending to erect, mostly 6-10 cm long, 3-5 mm wide, linear, flat, and tapering very gradually from below the middle to the narrowly pointed apex, the margin proximally strumose-ciliate, the surface yellow-green or strongly maroon-tinged, the upper side pilose, the lower surface smooth or pilose toward the base.

Inflorescence.--Spikelets ellipsoidal, acute, ca. 1.9-2.3 mm long, smooth, green, variously tinted with maroon or purple, arranged diffusely in an ellipsoidal or ovoid panicle 1/3 or less the total plant length, on shortish, ascending or erect stalks toward the tips of the slender, purplish, minutely scabrid panicle branches. First glume ca. 1 mm long, acute, somewhat keeled at the midnerve; second glume ovate, ca. 2 mm long, the short acute tip slightly excurved or erect, the rounded back strongly ribbed; sterile lemma similar in shape to the second glume.

Fruit.--(in this case the hard fertile lemma and palea!) plano-convex, ellipsoidal, apiculate, pale green, shining, ca. 2 mm long or nearly equalling spikelet, not pointed beyond it.

Distribution and Flowering Season

Granite outcrops and their immediate surroundings, Piedmont South Carolina, Georgia, Alabama. Flowering from August to frost.

Special Identifying Features

P. lithophilum is in that part of the sect. "Capillaria" that has spikelets under 2.5 mm long and panicles that rarely exceed 1/3 of the plant length. This thus relates it to P. gattingeri, P. philadelphicum in the southeastern U.S.A. It is distinguished from the former by its less plump spikelets,

its narrower leaf blades; it is distinguished from the latter by its longer spikelets and purplish-tinged foliage.

Habitat and Management Implications

P. lithophilum often forms stands on and around granite outcrops in full sun or light shade, usually where there have been vernal pools or inwash depressions. Thus its new leaves are arising at the time when Diamorpha, Sedum, Arenaria, Isoetes, Agrostis elliotiana, Juncus, Lindernia and other ephemerals are carpeting such places. By the time the Panicum is fruiting it is usually admixed with such plants as Viguiera porteri, Crotonopsis elliptica, Cyperus granitophilus, Talinum, Hypericum gentianoides, Bulbostylis capillaris, etc., and in some instances may be the dominant plant. In nature it falls well within that class of pioneer species that invades the granite, ultimately giving way to perennial herbs and finally to invading shrubs and trees, these last at first being mostly gymnosperms such as Juniperus, Pinus echinata, P. virginiana, P. taeda, which in turn give way to upland hardwood species. The site quality for pines or hardwoods is usually poor until the underlying granite is covered by considerable depth of soil, and fire has been a historical factor in helping keep granite glades open. Mainly the threat to this particular grass is from quarrying of the granite, together with careless trampling or driving over the outcrop pools. However, this is a weedy species which can resist such pressures better than most of its associates. Much of it now exists in protected state land in Georgia.

References

- Hitchcock, A. S. & Agnes Chase. 1950. Manual of the grasses of the United States, ed. 2, pp. 687-689. U.S.D.A. Misc. Publ. 200. U. S. Govt. Printing Office, Washington, D.C.
- Radford, A. E., C. R. Bell & H. E. Ahles. 1968. Manual of the vascular flora of the Carolinas, pp. 142-159. Chapel Hill, N.C.

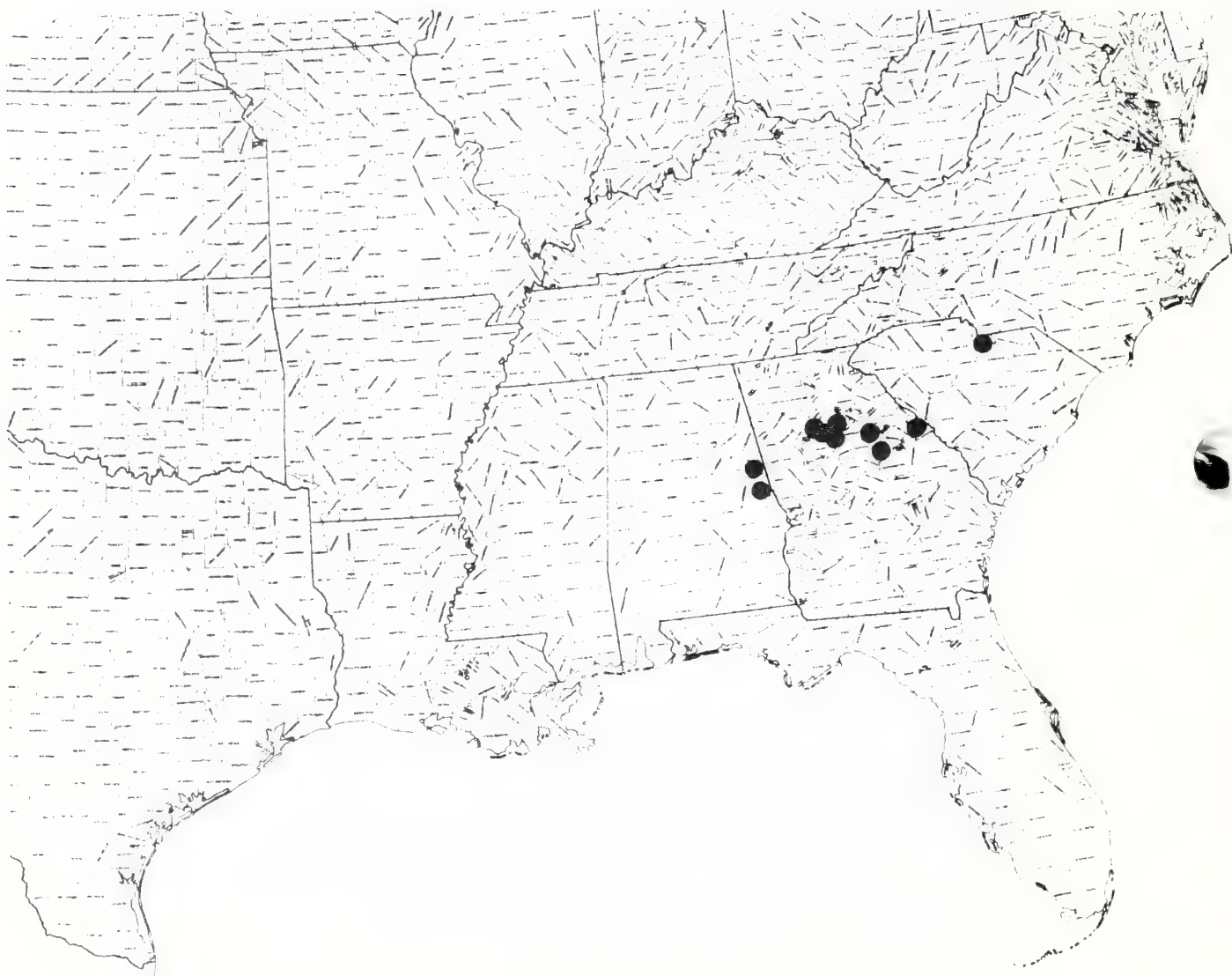
SPECIES Panicum lithophilum Swallen. Swallen's panic-grass

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			NA	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Panicum lithophilum Swallen



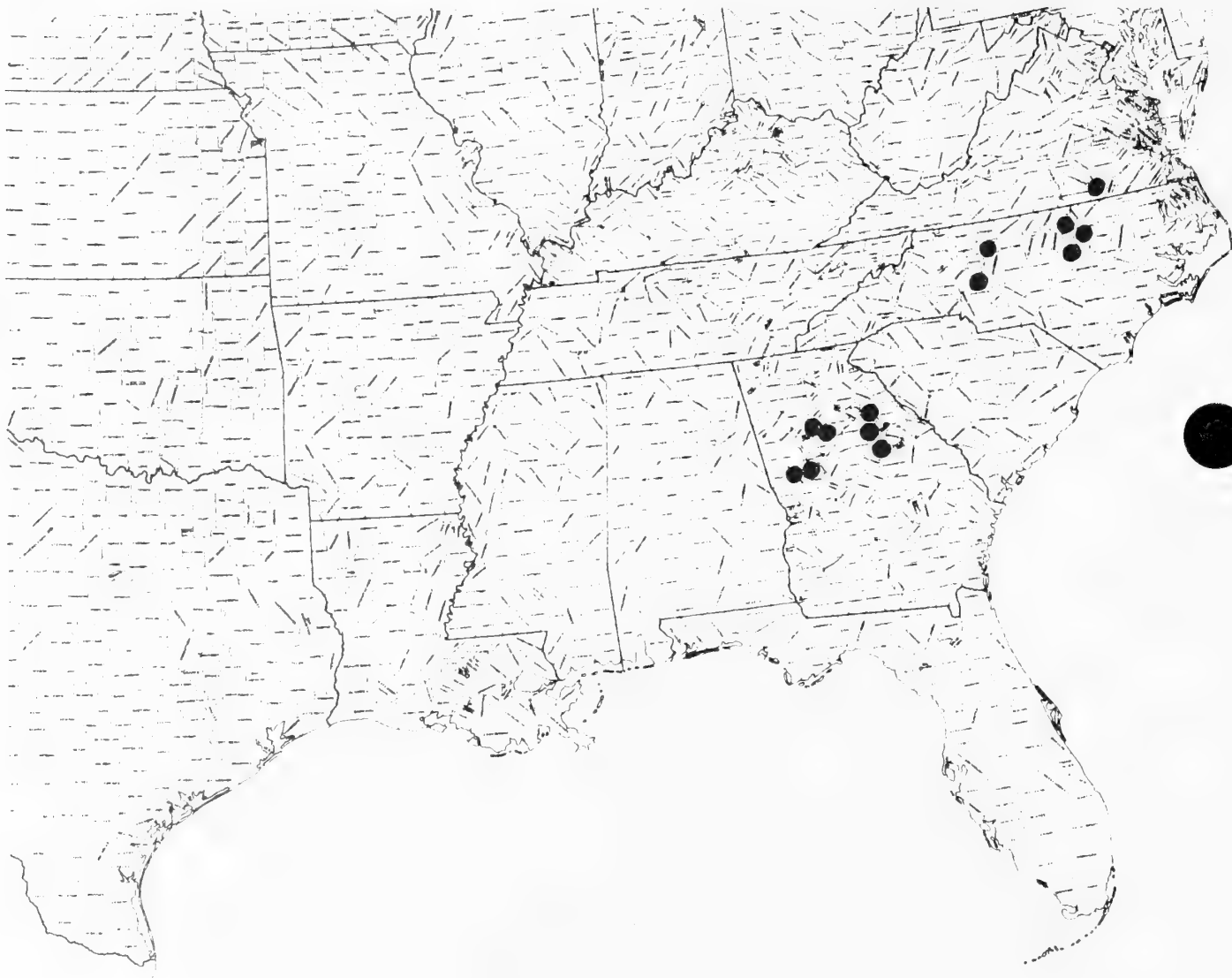
SPECIES Portulaca smallii P. Wilson. Small's purslane

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			NA	
Damage								X
No Lasting Effect	X							
Beneficial if Done Properly					X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Portulaca smallii P. Wils.



RANUNCULACEAE

Clematis catesbyana Pursh. Old man's beard virgin bower
C. virginiana L. var. catesbyana (Pursh) Britton
C. micrantha Small?

Technical Description

Rambling, sprawling or climbing perennial, herbaceous vine, sometimes forming masses several meters high or broad.

Stems.--Lower stems with thin, dull-brown, exfoliating bark, distally strongly ribbed, often white-appressed-villosulous, the newer shoots and branchlets villous-tomentulose with whitish or yellowish hairs.

Leaves.--Main shoot leaves ternately-pinnately compound, alternate, estipulate, sometimes to 2 dm long, usually shorter, the spreading or ascending petiole 5-10 cm long, ribbed, reddish-brown or greenish brown, appressed villous, distally 3-branched, each branch toward apex with 3-5 (-7) mostly 3, leaflets, the largest terminal, reniform, suborbicular or ovate, 3-5 cm long, coarsely toothed, the tooth tips acuminate or cuspidate, often also prominently 2-3-lobed, the base rounded or cordate, the upper surface dark, dull green or yellowish-green, smooth to sparsely strigillose, more heavily so along the impressed main veins, the lower surface paler, sericeous or soft-puberulent.

Inflorescence.--Main axes and lateral shoots terminating in an elongated panicle of cymes, the lower nodes of which produce compound leaves similar to those of main shoots but smaller, more sessile and with fewer, smaller leaflets, these gradually reduced upward along the main axis and upward on the inflorescence branches to become smaller still, the blades simple or trilobate, tomentose; inflorescence branches cymose, 2-6-flowered, the spreading rays tomentose, bracteolate, or the flowers solitary at peduncle tips (toward inflorescence tip).

Flowers.--Regular, perfect, 1.0-1.3 cm broad across the spreading sepals; sepals elliptic to lanceolate or obovate, ca. 5-7 mm long, acute, both surfaces densely white-sericeous-tomentose, the backs often tinged with purple, or pink, or pale green; stamens numerous, erect or spreading, ca. 5-6 mm long, the filaments broadly linear, very flattened, broader than the short-linear, 1 mm long, erect, yellowish anthers or some not as broad and others dilated only distally, thus more spatulate; carpels many, distinct, appressed-hairy, the elongated erect styles strongly white-pilose save at the short-linear stigmatic apex.

Fruit.--Akenes ellipsoidal, 3.0-3.5 mm long, pubescent, the elongated styles silvery-spreading-pilose.

Distribution and Flowering Season

Fencerows, borders of high and low hammocks, waste places, western peninsular Florida and northwestern Florida; flowering August into September (the range given is for the entity C. micrantha Small;

that for C. catesbyana proper is much broader and is Coastal Plain from South Carolina south into Florida, west into Louisiana!)

Special Identifying Features

As Dr. Keener (1975) points out, *C. micrantha* appears simply to be a smaller-flowered variant of *C. catesbyana*, but has broader sepals and shorter stamens. Specimens called *C. micrantha* do appear to be few, with some geographic fidelity, thus the taxonomy may be undetermined. In such a case it is advisable to attempt to preserve a doubtful taxon at least until the facts are in.

Habitat and Management Implications

The habitat in Florida of the extreme named C. micrantha Small appears to be the sunny edges of high and low hammock, where the vines may form rambling, climbing patches. The hammocks of the Brooksville area (the type locality) overlies deep Eocene limestones and are characterized by Magnolia grandiflora, willow and water oaks, live oak, red maple, green ash, red bay, etc., sometimes with a scattering of loblolly pine (which reaches its southern extremes here), longleaf pine. Sabal palmetto is throughout. The country is typical karstland, with high hills of sandy loam or sandy silt loam overlying reddish sandy clays, often dotted with outcropping limestones, the highlands interrupted by sinkholes, sinkhole lakes and ponds, or extensive bottoms. The Clematis grows along the edges of forest, in brushy cleared areas, or in places where the underlying limestone forms local outcrops (this last is particularly the case in the Mariana area of northwest Florida). The vines are never in dense shade, nor are they ever rooted in saturated soil. As is true of the closely related *C. virginiana*, such plants may be disturbance related, coming in where there have been recent clearings, or frequenting fencerows and rights of way at edges of undisturbed woodlands. I have observed weedy growths of these plants in orange groves! They are of course lost in the case of totally destructive logging, clearing for improved pasture, or (and this may be the most destructive influence) herbicide spraying along rows, in groves or fencerows. Quarrying of phosphate rock in the region is also a factor in endangerment.

References

- Keener, C. S. 1975. Studies in the Ranunculaceae of the southeastern United States. *Sida* 6 (1): 33-47.
- Pursh, Frederick. 1814. *Flora Americana Septentrionalis*, Vol. II. 736. London.
- Small, J. K. 1933. Manual of the southeastern flora, p. 525. Chapel Hill, N.C.

SPECIES Clematis catesbyana Pursh (incl. C. micrantha Small)

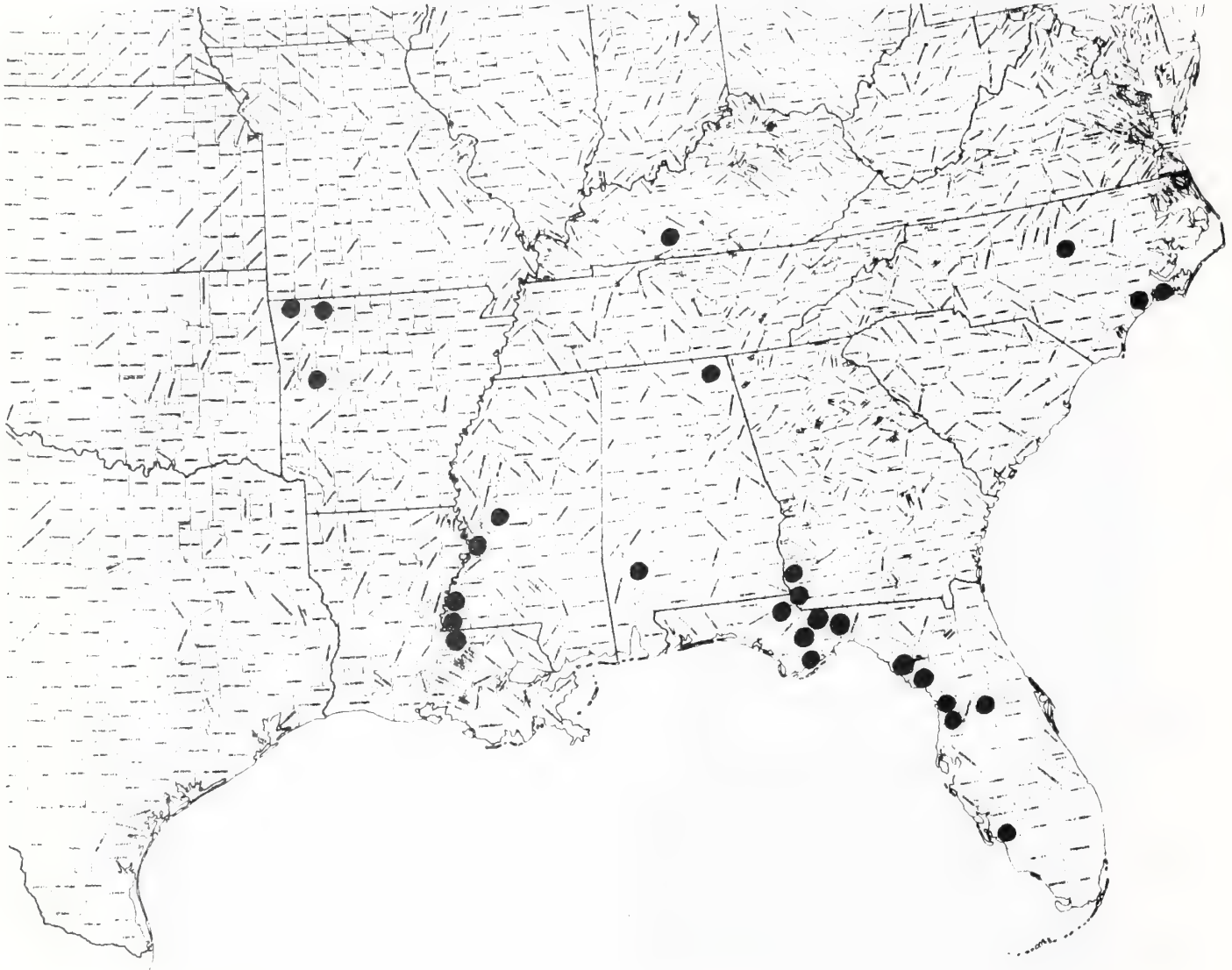
old man's beard virgin's bower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	X	X	X			X	
Damage								
No Lasting Effect								
Beneficial if Done Properly					X	X		

Other Comments: plants are suspected to be dangerous to livestock!

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Clematis catesbyana Pursh (incl. C. micrantha Small)



RANUNCULACEAE

Delphinium alabamicum Kral. Alabama larkspur

Technical Description

Perennial herb, the short caudex arising from a cluster of spindle-shaped roots.

Stems.--Usually solitary, erect, 5-10 (-15) dm long, by flowering time with basal nodes and internodes brownish, close-set, often leafless, above with internodes rather abruptly elongating, surfaces proximally often reddish-tinted, glabrous or pilosulous with hairs downcurved, upward on stem becoming pale yellow-green, sparsely to copiously recurved-puberulent or pilose, with an admixture of longer-spreading trichomes, in the inflorescence mostly densely recurved-puberulent and spreading-pilose, the plants unbranched or few-branched from the middle or upper nodes, or in the inflorescence, the branches ascending.

Leaves.--Rosette and lower stem leaves palmately deeply dissected, the segments spreading fanlike into a semicircular or orbicular outline on slender, pilose to nearly smooth petioles much longer than the blades; primary blade segments 3-5, mostly 3-6 cm long, joined only at very base, linear or oblong-linear, cuneate-based, bi-or-tri-branching into short to elongate-linear, spreading-ascending ultimate segments, these mostly acute, nipple-mucronate, the nipple whitish, apically depressed; blade surfaces yellowish-green, the upper smoothish, the lower with scattered pilosity and puberulence, this also along the margins. Leaves above mid-stem increasingly reduced, much shorter than internodes, becoming sessile, mostly 3-lobed, the uppermost linear.

Inflorescence.--Flowers either in a single terminal indeterminate raceme or a compound of a few, ascending racemes, the total inflorescence often fully 1/2 the total plant length and of 15 or more flowers.

Flowers.--Perfect, irregular, showy, the pedicels spreading, arcuately ascending, slender, the lowest longest, often several cm long, all by anthesis longer than the flowers, most subtended by a single, linear, acute, villosulous and hirsute bract and each with 2-3 short-linear, similarly hairy bracteoles distally, the pedicel surfaces with hairs both incurved-tomentulose and spreading-hirsute; sepals 5, an intense, deep, blue-violet, 2.5-3.0 cm broad and from tip of longest segment to tip of spur fully 3.0 cm long, the spur sepal (uppermost and longest) 3 cm long, the spur 1 cm long, the blade broadly oblong, apically acute or short-acuminate, spreading ciliolate, the inner surface smoothish, the outer surface spreading-pilose, the lateral sepals subequal, mostly oblong or obovate, ca. 1.5-1.7 cm long, acute to obtuse, broadly cuneate-based, the outer surfaces (backs) strongly strigose or hirtellous, particularly in the mid-zone; petals in 2 sets of 2, the upper pair connivent to produce a spur, this enclosed by the sepal spur, apically with

short, shallowly notched blades, the lower pair clawed, about as long as the lateral sepals, the blades of a similar color and deeply notched, the spur petals ca. 3 cm long, the spur 1 cm long, blade pale blue to near white, ovate, marginally ciliate, backs pilosulous or pilose, the claw petals bluish, ca. 1.5 cm long, the claw ca. 0.5 cm, bearing at its upper margin basally a spreading, short-oblong, erect auricle, the blade elliptical or ovate, ciliate-erose, narrowly and deeply cleft, the backs villous, the inner surfaces pilosulous; stamens numerous, ca. 1 cm long, the filaments flattened proximally, gradually narrowing and thickening toward the connective, smooth or sparsely hirsute, the anthers ellipsoidal, usually smooth; carpels narrowly lance-ovoid, ca. 0.5 cm long, the ovary sericeous.

Fruit.--Follicles 5, the bodies oblong, ca. 1.5 cm long, slightly spreading apically, pilose, the persistent styles ca. 0.5 cm long, arching outward; seeds somewhat asymmetrically obconic, obtuse-angled, truncate apically, 2 mm long, minutely soft-spreading-hairy, nearly black, the faces with irregular, shallow concavities.

Distribution and Flowering Season

Calcareous clearings or open woodlands or prairies, Black Belt of middle Alabama and in the Highland Rim of northwestern Alabama; flowering from may to mid-June.

Special Identifying Features

Delphinium alabamicum is in the range of two other species that somewhat resemble it, namely D. tricornu Michx., and D. carolinianum Walt. It differs from the former in being a taller plant, has narrower leaf segments, more erect follicles, and slightly longer, darker seeds. It differs from the latter in being a stouter plant, the flowers much larger and deeper in color, the follicles not as erect, the larger, darker seed not scaly.

Habitat and Management Implications

D. alabamicum thrives on basic soils derived from limestones, dolomites, chalks or marls. It is best developed on thin to deep, heavy clay soils, either in the full sun of prairies and glades or in open upland woods bordering such. If part of a prairie assemblage, this species is in association with such grasses as Sporobolus, Panicum, Andropogon, Melica, caricoid sedges, particularly Carex granularis, C. blanda, C. leavenworthii, C. festucacea, C. albolutescens, Scirpus lineatus, rushes such as Juncus interior, J. filipendulus, and a wide variety of prairie forbs in genera such as Silphium, Ratibida, Rudbeckia, Senecio,

Aster, Solidago, Ranunculus (particularly R. fascicularis), Polygaenia, Verbena, Allium, Sisyrinchium, etc. This is the black belt prairie type in which D. alabamicum was once known to occur, but which appears to have disappeared since. The largest extant populations are in northwestern Alabama in open and closing limestone glades, often in association with glade endemics such as Petalostemon gattingeri, Psoralea subacaulis, Leavenworthia, Lesquerella, on shallow soils that in a growing season range from wet enough to support Isoetes, Juncus, Callitriche at certain times of year, dry enough during summer to support Opuntia compressa, Agave virginica. Contiguous open woodlands, these often very limerocky, have this Delphinium. These woodlands are sometimes mostly Juniper, or have an admixture of upland hardwoods, particularly Quercus muhlenbergii, Q. shumardii, Q. alba, Q. stellata, Carya carolinae-septentrionalis, C. ovata, C. ovalis, Ulmus americana, U. rubra, Celtis, Fraxinus americana, Acer saccharum, etc. with an understory of Rhus, Cornus, Cercis, Bumelia, Diospyros. In that the best specimens of D. alabamicum are definitely either in open areas or at edges of woodlands and are not present in dense, closed stands of juniper-hardwood, it has to be assumed that the Delphinium is seral to juniper-hardwood. Logging will create area for it, has done so locally. The main threat to it at present comes from urban, residential, and industrial expansion. The type locality is now a trailer factory. Conversion of glades to improved pasture admits introduced grasses such as fescue, orchard grass, bermuda grass, which crowd out the larkspur. Conversion of the deeper soils to row crops has also taken place. Therefore it is not logging, but people and crop-oriented activity that makes D. alabamicum truly endangered.

References

- Kral, R. 1976. A treatment of Delphinium for Alabama and Tennessee. Sida 6 (4): 243-265.

SPECIES Delphinium alabamicum Kral. Alabama larkspur

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			X	
Damage								X*
No Lasting Effect	X							
Beneficial if Done Properly					X	X		

Other Comments: *while plants are toxic to stock, they are rarely eaten; however, stock may trample them.

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Delphinium alabamicum Kral



RANUNCULACEAE

Delphinium newtonianum D. M. Moore. Newton larkspur

Technical Description

Slender perennial larkspur, the stems arising from a fascicle of fusiform-tuberous roots 2-5 cm long.

Stems.--Erect, branching only in the inflorescence, usually arising singly from the rootstock, stiff but slender and fistulous, proximally usually purple-tinted, retrorsely and sparingly strigillose, increasingly short-recurved-pubescent upward into the inflorescence.

Leaves.--Alternate, both basal and cauline, the basal and lower cauline leaves long-petiolate, absent by flowering time, the persistent cauline ones largest toward or below mid-stem, on slender ascending, ribbed, sparsely villous or glabrous, green petioles to 10 cm long (usually shorter, particularly the upper ones), the blades in outline semicircular or reniform, mostly 8-15 cm wide, 4-7 cm long, deeply cleft-and-parted, the principal segments 3-7, spreading fanlike, mostly narrowly cuneate or oblanceolate, acute-tipped, upwardly ciliate, entire or themselves apically deeply 2-3-lobed, the blade base usually truncate; leaf surfaces above yellow-green, smooth or sparsely hirsute along the main veins, beneath much paler, hirsute along the main veins.

Inflorescence.--Few-to-many-branched, the branches spreading from the axils of the gradually reduced, simple or fewer-lobed, short-petioled upper stem leaves, recurved-puberulent, terminating in linear-bracteolate, open cymose racemes; pedicels slender, divaricate, mostly 1-3 cm long, bibracteolate, puberulent.

Flowers.--Distinctly zygomorphic, perfect, very showy; sepals 5, distinct, strongly unequal, the uppermost largest, spurred, the spur near white, ca. 2 cm long, projecting back, the blade spreading upward, ovate, similar to the pair of laterals and lower ones, all blades a very pale but bright blue, the margins ciliate, the surfaces nearly smooth save for a villosulous, yellowish-green sub-apical-distal thickened area (nectary?); petals 4, unequal, the blades projecting forward but shorter than the sepals, the upper pair with spurs projecting backward into the sepal spur, apically short-ovate-bladed, the blade bifid, hispid-hirsute, pale blue or near white, the lower pair with reduced spurs, strongly clawed, the broader, larger, pale blue blades deeply cut, hispid-hirsute; stamens numerous, distinct, projecting forward, the long filaments blue, somewhat flattened, apically slender, terminating in deep brownish, ellipsoidal, asymmetrical, basifixed anthers; carpels 3, lance-ovoid, distinct, smooth, each tapering apically into purplish blue, slender styles shorter than the stamens and each terminating in a truncate-papillose stigma.

Fruit.--Follicles usually 3, smooth, pale green, cylindrical-falciform, without the persistent style ca. 1.0-1.3 cm long, somewhat arching outward apically at maturity; seeds broadly ellipsoidal, pale brown, ca. 2 mm long, minutely and uniformly puberulent.

Distribution and Flowering Season

Dense to open upland woods over limestones; north-central and northwestern Arkansas; flowering from late May nearly through July.

Special Identifying Features

Its inflorescence is basically cymose, thus is determinate. That of the others (D. virescens, D. treleasii, D. carolinianum, D. tricornis) is an indeterminate raceme. D. virescens, D. treleasii and D. carolinianum all have narrower, longer inflorescences and all are plants of full sun or at most light shade, all have smaller flowers. The only other woodland larkspur in Arkansas is D. tricornis, which has a similar rootstock but which is a much lower, stouter-stemmed plant having (usually) a deeper violet-blue color of flowers, which are produced much earlier in the season.

Habitat and Management Implications

D. newtonianum prefers light to heavy shade of hardwoods, a moist loamy clay or sandy clay loam. It may be seen on the edge of such woodlands (as Dr. Moore himself first saw it!) but the large healthy stands are always in shade, and rooted in moist soils. Usually the site is sloping, sometimes steeply so, and it is often over calcareous rock or dotted with boulders of calcareous rock or sandier rock dislodged from above. In the overstory are such hardwoods as red oak, shumard oak, white oak, black oak, etc., red hickory, mockernut, pignut, hard maple, white ash, various elms, hackberry, etc., in short a facies of mixed mesophytic forest. The herbaceous cover is largely that of rich deciduous forest, namely Ranunculus, Hepatica, Anemone, Phlox divaricata, Arisaema, Sanguinaria, Actaea, etc., mostly long past flowering. Cimicifuga racemosa, Campanula americana, Galium arkansanum are usually present and overlapping in flower and several woodland grasses in genera Bromus, Elymus, Festuca, Panicum, Chasmanthium may be abundant.

The habitat is sensitive, easily erodible, and this is the problem. If the valuable species of hardwoods that make up the overstory are heavily logged, the slopes erode, the soils dry out, and several noxious species of weedy shrubs and vines move in, crowding out whatever Delphinium might survive the shock of the logging operation. The Delphinium is a definite sciophyte favoring moist, rich substrates, and thus would stand little chance of survival. Since a good part of the known area for this rare plant is still in private ownership, it is hoped that these owners are influenced to practise selective logging of their timber tracts.

References

- Moore, D. M. 1939. Delphinium newtonianum, a new species from the Arkansas ozarks. *Rhodora* 41: 193-197.
- Keener, C. S. 1976. Studies in Ranunculaceae of southeastern U.S. IV. Genera with zygomorphic flowers. *Castanea* 41: 12-20.

SPECIES Delphinium newtonianum D.M. Moore. Newton County larkspur

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X		X	NA	
Damage	X							X*
No Lasting Effect					X			
Beneficial if Done Properly								

Other Comments: *plants are toxic to livestock and often are untouched by them, but may be damaged by trampling.

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Delphinium newtonianum D. M. Moore



RHAMNACEAE

Sageretia minutiflora (Michx.) Trel. Tiny-leaved buckthorn

Technical Description

Diffusely branching, arching, sprawling, evergreen, leaning or even viney shrub, often climbing into crowns of overstory.

Stems.--Oldest growth terete, with bark grayish, thin, tending to exfoliate in narrowly rectangular plates; more recent growth with bark smooth, reddish-brown, or brown with anastomosing shallow longitudinal cracks; branchlets numerous, some spur shoots modified to straight, spreading thorns, the leafy shoots also spreading (often in 2 ranks), slender, villous-puberulous with sordid hairs, tan or reddish-brown.

Leaves.--Opposite or nearly so, distichous, simple, stipulate, the stipules linear-triangular, 1.0-1.5 mm long, reddish-brown, early deciduous, the petioles spreading, 1-2 mm long, puberulous, the blades mostly broadly ovate to oblong-ovate, mostly 1.5-4.0 cm long, acute, crenate-denticulate, the narrowly triangular denticles directed upward, glandular, the base rounded or cordate, the texture firm but thin, the surface above dark green, glossy, conspicuously reticulated, the lower surface slightly paler, strongly reticulate, the midnerve and stronger laterals, sometimes the entire surface, puberulent.

Inflorescence.--Terminal on leafy branches, usually a system of elongated spikes from all or most axils of reduced upper shoot leaves, the spike axis puberulous, 3-4 cm long, the many small flowers sessile, distant toward the spike base, more crowded toward its tip, each subtended by 2-several small, unequal, narrowly triangular, villous-backed, reddish-brown, scale-like bracts.

Flowers.--Perfect, regular, small, very sweetly fragrant, broadly campanulate, nearly round, from base to tip of calyx ca. 1.5 mm high, about as broad; hypanthium shallowly cup-shaped, broadly rounded at base; calyx lobes 5, erect or with spreading tips, greenish-white, triangular, acute, ca. 0.5-0.6 mm long, rather fleshy, with 1 raised nerve above; petals 5, whitish, distinct, ascending, ca. 0.6 mm long, broadly oblong, short-clawed, retuse, apically somewhat cupped; stamens 5, opposite the petals, the anthers cupped within the fleshy filaments ca. 0.3 mm long, the broadly oblong anthers erect, ca. 0.4 mm long, apiculate; hypogynous disc a strong, fleshy annulus; ovary superior, ovoid, trilobed, ca. 0.6 mm high, the fleshy style ca. 0.3 mm long, the stigma lobes short, 3.

Fruit.--A drupe-like berry subtended by the spreading calyx lobes and bracts, nearly round, 6-9 mm long, the fleshy part thin, anastomosing-venose, the nutlets shaped somewhat like corn grains (broadly wedge-shaped).

Distribution and Flowering Season

Hardwood forest over limestone, sometimes on kitchen middens,

beach borders, Coastal Plain, North Carolina south into peninsular Florida, west in the Gulf Coastal Plain into Mississippi.

Special Identifying Features

Sageretia minutiflora is the only species of this small, primarily Asian genus to occur in the United States. Of our own genera of Rhamnaceae it is most similar to Rhamnus, differing from it in its shallower calyx tube (hypanthium?), its more prominent interstaminal disc, its less prominent stigmatic lobes. Also the southeastern area Rhamnus lack the sprawling, viney habit of S. minutiflora.

Habitat and Management Implications

This rather rare and local plant appears to prefer shade and a calcareous substratum. Optimal habitats are shaded shell sands, old kitchen middens, limesinks, low or high hammock with much limestone shallow or outcropping, usually along rivers or streams that flow through or over limestone. The plants in spite of their size are inconspicuous because of denseness of other understory vegetation, the primary shoots often reaching up into the crowns of lower trees so that only the exfoliating bark of the leafless lower parts of the Sageretia are evident. Associated overstory varies depending on the part of the range considered, to the north largely oak-hickory-maple, beech with Magnolia grandiflora in the Florida and Gulf Coastal sites, much Sabal palmetto in some Florida sites. Sabal minor is often present, sometimes Serenoa in the understory, together with frequent Ostrya, Carpinus, Myrica, Sebastiana, Persea, Ilex, Viburnum, Cornus, Bumelia, Rhamnus, etc. in varying proportions.

The plant is endangered primarily by clearcutting, and by residential and recreational site building. Much of its former area in Florida has now been converted. Selective or group selective logging, providing there is not excessive damage by the operation, likely has little effect on Sageretia in that the plants may sucker readily and actually are not obligate shade types. Clearcutting and subsequent site preparatory activity would be destructive. Fire is not an historical factor in the development of hammock vegetation, hence would be a destructive factor. One thing is certain. These plants are local in occurrence and little is really known about their ecology. In such instances it pays to find out what niche they occupy. Fortunately there are several populations of Sageretia on state or Federal lands in Florida, so that relatively undisturbed habitat for it is likely to remain available.

References

Small, J. K. 1933. Manual of the southeastern flora, pp. 830-834.
Chapel Hill, N.C.

Radford, A. E., C. R. Bell, and H. E. Ahles. 1968. Manual of
the vascular flora of the Carolinas, p. 694. Chapel Hill, N.C.

SPECIES Sageretia minutiflora (Michx.) Trel. tiny-leaved buckthorn

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	X	X	X				
Damage						X		
No Lasting Effect					X			
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Sageretia minutiflora (Michx.) Trel.



ROSACEAE

Geum geniculatum Michx. Bent avens

Technical Description

Rosulate and caulescent perennial herb from a stout, ascending caudex and a diffuse-fibrous root system.

Rootstock.--Caudex covered by chaffy, dark-brown remnants of old leaf bases and stipules, these bristly-ciliate.

Stems.--Erect or ascending, simple, branched only in the inflorescence, terete, to 1 meter tall, toward base purplish, retrorsely hirsute-hispid, upwardly becoming greenish or green tinged with purple, increasingly hirsute, the hairs more spreading and admixed with spreading puberulence, toward tips and in branches of inflorescence with hairs often gland-tipped.

Leaves.--Both basal and alternate on stem: rosette leaves persistent, spreading to erect, the stiffish petioles usually much longer than the blades, often purplish-tinted, spreading or retrorsely hispid-hirsute, proximally ribbed but terete, distally strongly grooved above, the blades reniform to suborbicular or obovate, simple to lyrate-pinnatifid or trifoliolate, the margin coarsely and irregularly sharp-toothed, the simple blades apically rounded, often incised, or shallowly trilobed (as in red maple), the bases rounded, truncate or cordate, the pinnately lobed blades with terminal blade much the largest, ovate to suborbicular or even reniform, often shallowly trilobed, the uppermost lateral divisions ranging from nearly as large to abruptly much smaller, inequilateral, the median and lower laterals in distant pairs, usually much smaller, inequilateral, acute, cuneate-based, the trifoliolate blades with petiolules, the terminal leaflet again largest, the laterals spreading all usually obovate, unevenly serrate, sometimes also incised-lobed, cuneately based; stem leaves progressively shortening upward on stem, ultimately sessile, the stipules broadly ovate to lanceolate, foliaceous, acute, entire or serrate, the bases broadly to narrowly cuneate, the blades trilobate or trifoliolate, mostly ovate-lanceolate or ovate, unevenly serrate, also often incised-lobed, the bases cuneate, usually entire; upper leaf surfaces hirsute, deep yellow-green, lower leaf surfaces hispid-hirsute, sometimes also puberulent.

Inflorescence.--A strongly bracteate system of few-to-many-flowered cymes, the branches (on larger plants) stiffly ascending at ca. 45° angles, rather densely hirsute and puberulent, with bracteal leaves progressively narrowed and smaller in the inflorescence, the stiffish, erect to ascending slender pedicels longer than the flowers.

Flowers.--Regular, perfect; hypanthium shallow, narrow, its margin bearing short-oblong bractlets 2-3 mm long just below the sharp calyx sinuses; receptacle convex, often white-pilose; calyx lobes persistent, 5, ca. 7-8 mm long, ovate-triangular, the backs green tinged with maroon, strigose-hirsute, also puberulent and glandular

the margins ciliate, the upper surface smooth, green; petals 5, distinct, obovate-cuneate, 0.7-10.0 mm long, ascending, the broad, wavy distal margin emarginate, the smooth surface white or white strongly suffused with broad bands of pink or purple, very veiny; stamens very many from the hypanthial rim, the greenish-white filaments dilating and flattened proximally, slightly shorter than the sepals, the ellipsoidal anthers reddish-brown, 1.0-1.2 mm long; carpel bodies numerous, distinct, oblanceolate in outline, green, dorsiventrally compressed, hirsute, apically slender, often glandular-hairy; style very elongate, fully 1 cm long, slender, the lower half smooth or proximally glandular-hairy, at its tip with one close loop, above this the slender erect upper half spreading pilose, terminating in a narrow, short-linear stigma.

Fruit.--Akenes ca. 0.4-0.5 mm long, the body ascending-pilose-hirsute, somewhat margined, the style persistent (at least to the middle or to the coil).

Distribution and Flowering Season

Moist rocky woodlands, edges of balds, local toward summit elevations in the Blue Ridge of western North Carolina and eastern Tennessee; flowering from July to early September.

Special Identifying Features

Geum geniculatum, excepting G. radiatum, another rare species of the high southern Appalachians, is the largest flowered species of southeastern area Geum. G. radiatum however is at once distinguished by its very showy large yellow petals and its unbent style; the petals of G. geniculatum are white, greenish-white or pinkish-purple-tinted. G. geniculatum may be distinguished from all southeastern Geum by the length of its styles (fully 1 cm) which are at the middle coiled; the other southeastern Geum have styles coiled (geniculate) above the middle.

Habitat and Management Implications

This rare Aven is seemingly found above about 4,000 ft. altitude and only on a few summits. It is located under or around hardwood forests made up of Betula lutea, B. lenta, Sorbus americana, Aesculus octandra, Prunus pensylvanica, Fagus, Quercus rubra, Acer spicatum, A. pensylvanicum, A. saccharum, etc., these species often admixed with red spruce and Fraser fir. The understory often has heavy growth of several heaths, but particularly Rhododendron catawbiense, R. maximum, R. calendulaceum, Lyonia, Vaccinium; other shrubs are Rubus odoratus, Ribes, Viburnum alnifolium, Sambucus pubens, Diervilla, etc. I have not seen this species unless it is heavily admixed with composites

such as Aster acuminatus, Eupatorium rugosum, Prenanthes, other herbs such as Impatiens pallida, Laportea. Many ferns and lycopods are present, along with the montane Oxalis acetosella and dense carpets of mosses. The Geum, while often locally abundant, is often hard to see because of associated herbs and ferns, and often only the tops of it are visible. The substrate is moist, acidic, very well drained, but never drying out, always highly organic. Such soils accumulate amongst the granite-bouldery talus that has developed at or toward the summit elevations. It must be emphasized that this Geum is a shade plant, while its rare neighbor, G. radiatum, is a plant of sunlight, thus the former is liable to increase as mature forest develops and the latter to decrease, particularly as Rhododendron enroaches on its area.

Over much of its narrow geographic range this plant is now protected, in that it is largely in either state or national forest or in protected private land (i.e. Grandfather Mountain, Bluff Mountain). Thus the overstory that is so essential to it is being preserved, as it should be since this shade dependent species would fast disappear if the cover were cut away, the openings resultantly being filled by grasses or more aggressive understory shrubs, and the soils drying excessively.

References

- Chapman, A. W. 1897. Flora of the southern states, ed. 3: 135. Cambridge, Mass.
- Gray, A. 1841. Notes of a botanical excursion to the mountains of North Carolina. Am. Journ. Sci. 42: 1-49.
- Rydberg, P. A. 1913. Rosaceae, in North Am. Fl. 22: 406.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 6.7-619. Chapel Hill, N. C.

SPECIES Geum geniculatum Michx. Bent avens

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	NA	NA	NA		X	NA	X
Damage					x			
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Ceum geniculatum Michx.



ROSACEAE

Waldsteinia lobata (Baldw.) T. & G. Piedmont strawberry

Technical Description

Perennial herb, producing rosettes at tips of very elongate, brownish, shallowly-set, forking rhizomes 2-5 mm thick, or sometimes rhizomes producing flagelliferous and stoloniferous shoots along which the leaves are alternate, scattered.

Leaves.--All but oldest portions of rhizome covered by a densely overlapping "shag" of brownish or reddish-brown scale leaves; rosette leaves numerous, erect or spreading, 10-20 cm long, mostly petiole, the abruptly dilated, reddish petiolar bases clasping the abbreviated stem (rhizome) tip in a tight spiral, this usually subtended by spirals of reddish, hispid-hirsute and long-ciliate, narrowly triangular scale leaves 1.0-1.5 cm long; petioles slender, hirsute, sometimes scattered-puberulent also, proximally reddish, distally greenish, terete, low-ribbed; leaf blades reminiscent of many Ribes, suborbicular to broadly ovate or reniform, mostly 3-8 cm long, deeply to shallowly incised-lobed, the principal divisions mostly 3-5, broadened distally, the sinuses very narrow, the segment margins variously incised, also rather coarsely and unevenly serrate-dentate; upper blade surface dark yellow-green, strigose-hirsute and densely hirsute with shorter hairs along the veins, these often with a scattering of reddish, sessile glands; lower blade surface markedly paler, the pubescence heavier with some long-stiff hairs, but mostly downy, and particularly dense along the major, palmately disposed, veins.

Inflorescence.--Peduncles equal to or slightly shorter than the petioles of foliage leaves, 1-few per shoot, erect, axillary to chaffy, triangular, reddish-brown bracts just below the foliage leaves at rhizomal tips, slender, terete and channelled, hispid-hirsute, also puberulent with hairs spreading to somewhat retrorse, medially bearing 1, linear bractlet, the flowers few to many, usually somewhat scattered along the axes of a variously spreading pair of indeterminate racemes mostly 4-6 cm long, the slender spreading pedicels villosulous and hispid-hirsute, ca. 1 cm long, each subtended by a foliaceous, linear to oblong or spatulate, acute, sparingly low-toothed or entire, hispid-hirsute bract 0.5-2.0 cm long, these bracts gradually reduced toward raceme tips.

Flowers.--Regular, bisexual, at anthesis ca. 1 cm broad; receptacle strongly pilose-hispid; hypanthium green, funnelform, ca. 3 mm high, hispid-hirsute, glandular; calyx lobes 5, green, triangular, spreading, ca. 3 mm long, sparsely ciliate, the upper surface villosulous-cinereous, the backs hispid-hirsute and sparsely glandular; stamens very many, distinct, spreading or erect from hypanthial rim, the slender filaments slightly flattened, yellowish, ca. 3 mm long, the dorsifixed anthers yellow, broadly oblong, ca. 1 mm long; petals 5, bright yellow, distinct, spatulate or oblance-

eolate, spreading, equal to calyx lobes or slightly shorter; carpels 2-3, distinct, basally attached, the body compressed-obovoid, ca. 2 mm long, villosulous, the slender style ca. 3 mm long, early deciduous, its base sparsely soft-hairy, jointed to the ovary apex and terminating in a narrowly capitate stigma. Fruit.--Akenes similar in shape to carpel bodies, ca. 3 mm long, plumper, villosulous-tomentose.

Distribution and Flowering Season

Acidic, shaded, rocky ravines and creek or river bluffs, Piedmont and Blue Ridge, Georgia and northwestern South Carolina; flowering from April into May.

Special Identifying Features

W. lobata differs from the other 2-3 taxa of the southeastern area in its broader leaves which are merely incised rather than divided and in the pubescent (rather than smooth) style bases. This plant differs also in the extreme length of its rhizomes which often attain lengths of a meter or more.

Habitat and Management Implications

W. lobata is a shade plant, growing on deep to shallow sandy loams in acid-rocky woods, often a part of the shallow mantle of moss and duff that covers boulders or bluff ledges. Common associated genera are Galax, Mitchella, Asplenium, Polystichum, Dryopteris, Hepatica, Sanguinaria, Hexastylis, Tiarella, Trillium (particularly T. cernuum, T. cuneatum, T. catesbaei), Polygonatum, Erythronium, etc. The substrate has a high sand fraction, is very well drained, usually moist (but seasonally becoming dry). The steep sites it frequents often have dense growths of Rhododendron (particularly R. maximum, R. minus) and Kalmia. The overstory varies, a reflection of the complex metamorphic geology of the region, in that calcareous rock (such as marble) may be nearby as well as acidic rock. Thus the dominant species may be oak-hickory-pine, oak-pine-juniper, or in the richest, deepest ravines, mixed mesophytic with much beech, hard maple, buckeye and ash.

This plant is too rare for many conclusions to be reached about its present abundance related to past occurrence. Small (1933) indicates a range that includes the Piedmont of the Carolinas but current listings of the flora of the Carolinas do not include W. lobata. I have seen it only in or near areas where marble is presently being quarried and can state that this activity is totally destructive of the habitat. In that the plants occupy rather shallow, at least seasonally moist, soils under light to heavy shade, it would follow that heavy logging

would be risky. This would be true particularly of Piedmont Georgia where clearcutting of the forest or even moderate logging is often followed by an invasion of noxious herbaceous and woody weeds such as Lonicera, Pueraria, Smilax, Rubus, etc., which tend to crowd out spring flowering herbs. It is suggested that this species be considered endangered rather than threatened.

References

- Small, J. K. 1933. Manual of the southeastern flora, pp. 616-617. Chapel Hill, N. C.
- Torrey, John and Asa Gray. 1838-1840. Flora of North America I, P. 426. New York.

SPECIES Waldsteinia lobata (Baldw.) T. & G. Piedmont strawberry

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	X	X	X		X		
Damage					X			X
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Waldsteinia lobata (Baldw.) T. & G.



10/10/10
10/10/10

10/10/10

SANTALACEAE

Nestronia umbellula Raf. Common nestronia

Technical Description

Strongly clonal, deciduous, smooth, dioecious shrubs mostly 3-10 dm tall, parasitic on roots of hardwoods or pines.

Shoots.--Primary shoots mostly stiffly erect, broad-crowned, terete, smooth, reddish-brown, the bark of older wood thin with a thin, pale, anastomosing exfoliating cuticle, the branching opposite, the new shoot growth greenish; winter buds triangular, imbricate-scaly, the scale backs reddish-brown, smooth.

Leaves.--Opposite, subdistichous, simple, estipulate, spreading or ascending on short (2-3 mm) petioles, the blades mostly elliptic, oblong, lanceolate or broadly ovate, 2-6 cm long, acute, entire with narrow pale granular margins, the bases cuneate to short-attenuate, the upper surface dark dull yellow-green, the lower surface markedly paler.

Inflorescence.--Male plants with simple umbels produced on slender, erect or ascending, supra-axillary, bractless peduncles 1-2 cm long, the (mostly) 3-6 flowers spreading on very slender pedicels 2-4 mm long; female plants with larger flowers, these solitary, axillary, on stouter peduncles 5-7 mm long, and terminating in a joint, around the rim of which are 1-several, peg-like, reddish-tipped appendages (bracts?), and to which the hypanthium is jointed.

Flowers.--Regular; male flowers yellow-green, with the slender pedicels dilating apically and merging imperceptibly with the funnellform hypanthium; calyx lobes (3-) 4, triangular, 2.0-2.5 mm long, spreading-recurved, acute, the margins papillate, particularly distally; petals none; stamens 4, erect, ca. 1.5-2.0 mm long, opposite the sepals and projecting the anthers slightly above the calyx orifice, the filaments ca. 2 mm long, arising from the hypanthial rim just below the sepal sinus, their dilated bases tucked under the thin hypanthial edge, the dorsifixed anthers broadly ellipsoidal, ca. 0.6 mm long, the connective appendaged with several very long, flattened, pale, reflexed trichomes that connect with opposing sepals. Female flowers with hypanthium narrowly obconic, mostly 6-7 mm long, maroon, the spreading-recurved sepal lobes fleshier than in the male, ca. 3 mm long; stamens present, 4, erect, the anthers non-functional; ovary inferior, the single style stout-linear, erect, ca. 2 mm long, terminating in a 3-4 lobed stigma.

Fruit.--Drupeaceous, obovoid, ca. 1 cm long, the 4 sepal lobes erect, persistent on the truncated summit.

Distribution and Flowering Season

Sandy, usually open woodlands, Piedmont and Coastal Plain, scattered from eastern Virginia southward to Georgia and Alabama; flowering in April and May.

Special Identifying Features

Nestronia is monotypic, different from other shrubby Santalaceae by the umbellate male florets (sharing this only with Buckleya), and the unique trichomal webbing between anthers and sepal bases. In Buckleya, a much taller shrub, the male inflorescence is terminal rather than axillary.

Habitat and Management Implications

N. umbellula is very local, but produces large clones, usually in deep, moist to quite dry sands, sandy loams or sandy clays. Oddly, most clones, if in proximity are all of one sex or the other, with the female much more rare, often producing few flowers. The overstory varies. Some stands are found in sandhills ecotones to shrub bog, and are under various species of yellow pine, upland oaks and hickories, with abundant ericaceous shrub associates. Still other clones are found in open upland stands of oak-pine-hickory, others under mixed upland hardwoods. Some authors indicate that the plants parasitize pines exclusively, whilst others comment that the hosts are exclusively hardwoods. A study is currently being run on this. However it can be concluded that the habitat is usually open woodland, rather dry, usually sandy, and that the substrate is typically quite acid.

In that the plants are root parasitic it follows that removal of the hosts through logging or clearing removes the parasite. Also, in that most of the forest types these shrubs are found in are fire disclimax or have fire in their history, it may be concluded that periodic woods fires have no adverse effect, so long as the hosts are not killed.

References

- Radford, A. E., C. R. Bell and H. E. Ahles. 1968. Manual of the vascular flora of the Carolinas, pp. 396-397. Chapel Hill, N.C.
- Rafinesque, C. S. 1836. New flora of North America 3, New Sylva, p. 12. Philadelphia, Pa.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1248-1249. Chapel Hill, N. C.

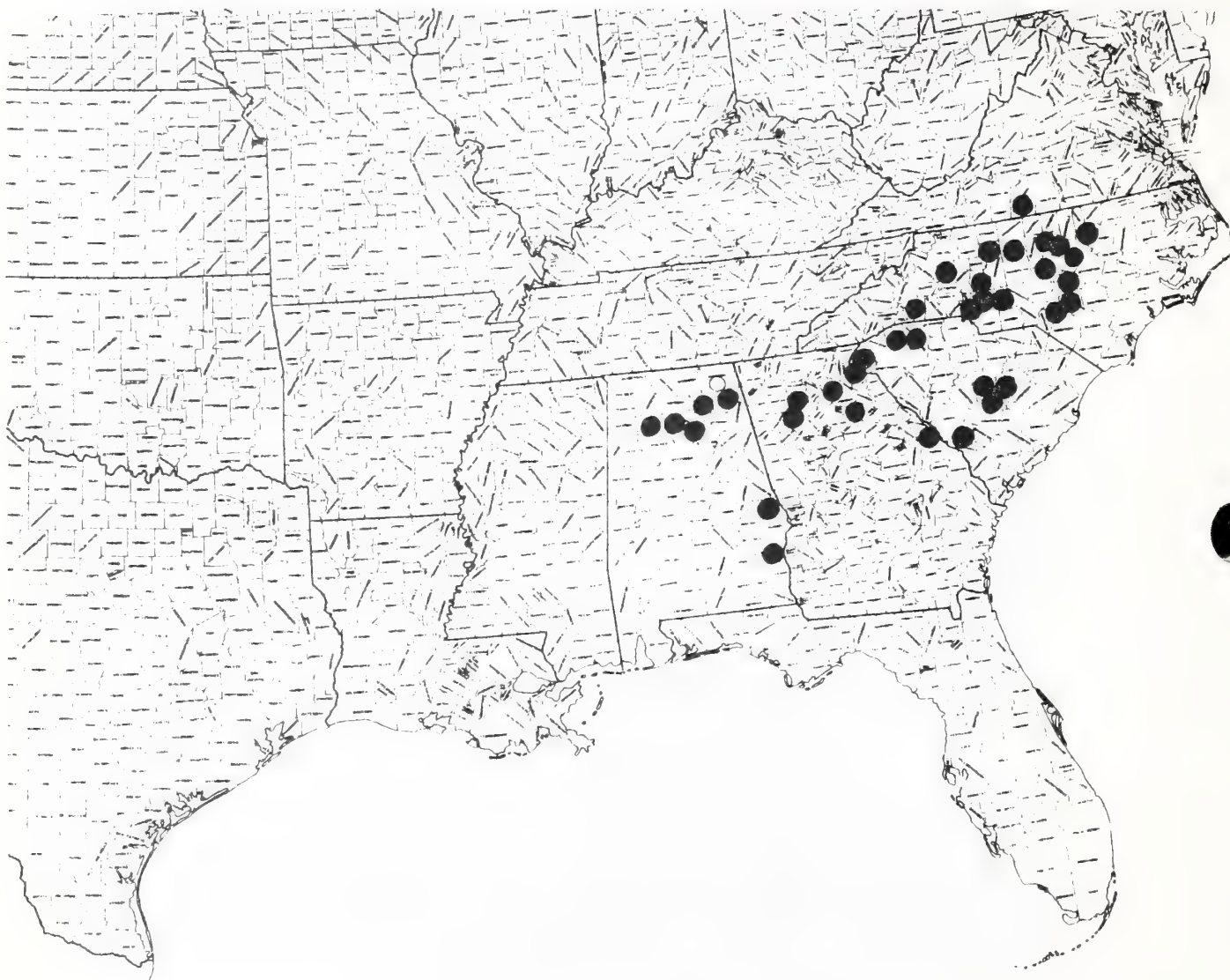
SPECIES Nestronia umbellula Raf. common nestronia

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X				
Damage						X*		x*
No Lasting Effect	X				X			
Beneficial if Done Properly								

Other Comments: if cutting means removal of host root system, then plants would be destroyed; family is poisonous to stock, but plants could be damaged by trampling.

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Nestronia umbellula Rafinesque



SAXIFRAGACEAE

Heuchera arkansana Rydb. Arkansas alumroot

H. villosa Michx. var. arkansana (Rydb.) E. B. Smith

Technical Description

Rosulate perennial herbs from elongated, stoutish surficial or shallow, creeping rhizomes with an exfoliating epidermis.

Leaves.--Numerous in the basal rosette, erect or spreading, highly variable in length, sometimes the "tufts" to 4 dm high, the petioles to 3 dm long; petioles slender, rigid but soft, terete, ribbed, pale green or tinged lightly with red, villous with most of the pale hairs gland-tipped, the petiole bases abruptly clasping; blades 1/2 or less as long as the petioles, soft, reniform to sub-orbicular, angulately low-lobed, the 5-7 broad lobes rather coarsely, somewhat unevenly dentate, the larger teeth tipped with a calused denticle, this bearing an elongate, gland-tipped trichome, the base shallowly to deeply cordate; upper leaf surface a dark dull green, villous-hirsute, the hairs gland-tipped, these hairs admixed with short-stipitate to sessile glands, the lower surface markedly paler, villous-hirsute-glandular.

Inflorescence.--Peduncles 1-several, from the axils of the leaves, erect or ascending, slightly shorter than to somewhat longer than the leaves, slender, with a few, distant, lance-linear, scarious-bordered, villous-ciliate, scaly bracts, the lowest ca. 1.0-1.5 cm long, the main axis terete and ribbed or slightly angulate, villous-glandular, with the glands shorter-stalked in the inflorescence; panicle cylindrical, ca. 7-15 cm long, the numerous, slender primary branches ascending or spreading, from axils of scale-like bracts, simple or forking once, the few-to-several pedicels short, stipitate-glandular, scaly-bracteolate, in short, indeterminate racemes or corymbs, the whole inflorescence densest distally, more open toward the narrow base.

Flowers.--Hypanthium with 5 calyx lobes forming a campanulate outline, from base to tip ca. 2 mm high, the whole surface stipitate-glandular; calyx lobes slightly unequal, erect, thus calyx apex slightly oblique, the lobes narrowly ovate to oblong, ca. 1.0-1.3 mm long, apically rounded, marginally stipitate-and-glandular-ciliate, pale green; petals 5, distinct, arising from hypanthial rim, linear-spatulate or linear oblanceolate, lingulate, ca. 2 mm long, apically excurvate, white; stamens 5, unequal, distinct, arising from hypanthial rim, erect, the filaments linear-terete, the longest to ca. 2.5 mm, the nearly orbicular, pale yellow anther sacs dorsifixed, divaricate, with lateral dehiscence; ovary bicarpellate, nearly superior, fused to hypanthium only at very base, the body ovoid, ca. 1.5 mm high at anthesis, tapering gradually into the stiffish, somewhat divergent, stout-linear styles, these each tipped by a short, papillate stigma.

Fruit.--Capsule broadly ellipsoidal, 2-valved, from base to tip of persistent style ca. 6-7 mm long, the body fused to hypanthium

ca. 1/3 its length; seeds pale brown, short-cylindrical, slightly curvate, longitudinally with many muriculate lines, ca. 0.7 mm long.

Distribution and Flowering Season

Shaded ledges of calcareous or acidic rock, the Ozarks, north central to northwestern Arkansas; flowering from June to September.

Special Identifying Features

Recently Smith (1977) broke from tradition by making this another variety of H. villosa, a common and widespread plant of shaded or sunny cliffs and ledges through much of the eastern U.S. It is true that the Arkansas material differs in its somewhat shorter, broader-based flowers (these often appear "round"), its more compact inflorescence. It is usually a smaller version of H. villosa macrorrhiza, a very robust plant locally abundant in calcareous bluffs along the Cumberland and Tennessee Rivers in Kentucky and middle Tennessee. When H. arkansana was first described it was considered an Ozarkian disjunction from H. villosa proper. Recent collections have closed the gap and even the variety is tenuous if a consistent taxonomy for Heuchera is sought.

Habitat and Management Implications

H. arkansana is confined to ledges of calcareous or sandy rock along the major stream and river systems. Usually these ledges are in the shade of mixed hardwoods, less often in full sun and, in the sunny sites, there is usually some seep water at least part of the year. Associated herbaceous plants are mostly ferns, a few carices, grasses such as Festuca, Bromus, and other saxifrages. Lianas are common over the rock, particularly Vitis, Parthenocissus, Ampelopsis, Rhus radicans, etc. The Heuchera is shallowly rooted in a shallow soil mantle, this often held together by various mosses and liverworts, all frequently breaking or slipping away from the rock during rainy spells, or washing away from the Heuchera rhizomes, leaving them largely exposed. In that such habitat is so sensitive, clear-cutting of the forest on the steep slopes and contiguous river and creek bottoms definitely would have an adverse effect on this rock plant. The greatest danger to the plants however has come from the excessive dam building within the range of the species, so that the lower reaches of many of the bluffs it used to frequent have been inundated by reservoirs.

References

Rosendahl, C. O., F.K. Butters & O. Lakela. 1936. A monograph

on the genus Heuchera. Minn. Studies in Plant Sci. 2: 1-180.

Rydberg, P. A. 1905. North American Flora 22 (1): p. 101.
New York Botanical Garden. Bronx, New York.

Smith, E. B. 1977. Notes on the Arkansas Saxifragaceae. Proc.
Ark. Acad. Sci. 31: 100-102.

SPECIES Heuchera arkansana Rydb. Arkansas alumroot

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	NA	NA	NA		X	NA	
Damage					X			X
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Heuchera arkansana Rydb.



SAXIFRAGACEAE

Saxifraga careyana Gray. Golden-eye saxifrage
Micranthes careyana (Gray) Small

Technical Description

Rosette-forming perennial herb from a short-fleshy caudex-like stem, perennating by short offsets from the erect crown.

Leaves.--The largest all basal, numerous and spreading, rather fleshy and stiffish, highly variable in size, from 3-5 cm long, the petioles ca. 1/2-2/3 the total leaf length, broadly lineal, their backs broadly rounded, the upper side concave, proximally dilated abruptly to a clasping, reddish-villous-hairy, thin-bordered, villous-ciliate-margined base, dilated more gradually distally into the blade base; leaf blades mostly of a broad type, suborbicular to reniform or broadly ovate, apically rounded, marginally low-dentate, prominently coarsely dentate, or serrate-dentate, villosulous with brownish-red hairs, the tooth-tips often callused-apiculate, the base entire or nearly so, truncate or rounded, abruptly attenuated on the petiole, the upper surface sparsely to densely villous with weak pale hairs, deep green, the lower surface often reddish, appressed-or-erect-villous with longer, browner hairs.

Inflorescence.--Scapes mostly 15-30 cm high, erect, terete and ribbed, soft and brittle, pale green, spreading-villous with soft sordid hairs, these sometimes tipped with a red gland, bractless or with a few reduced, leaf-like bracts proximally, regularly forking-branched and scattered-bracteolate distally to produce a many-flowered cyme, the slender ascending-divaricate cyme branches sparingly glandular-villous and stipitate glandular.

Flowers.--Regular, bisexual on slender, stipitate-glandular pedicels to 1 cm long, usually these subtended by a small, erect bracteole; hypanthium at anthesis very shallow; calyx lobes 5, triangular, green or tinged with red, ca. 1.5-2.0 mm long, acute, spreading, smooth; petals 5, spreading, distinct, elliptic or broadly lanceolate, ca. 4 mm long, white or pale pink, toward the base bimaculate, the spots yellow; stamens usually 10, distinct, from the narrow rim of the hypanthium, spreading-ascending, the slender, fleshy, teretish filaments white or pink-tinted, ca. 3 mm long, the yellowish, nearly round, basifixed anthers ca. 0.7 mm long; ovary nearly superior, of 2 distinct, whitish carpels ca. 2.5 mm long, these with white, conical bodies tapering distally into short, fleshy, divaricate styles, each with a capitate stigma.

Fruit.--Ripe follicles similar in shape to carpels but from base to tip of style beak ca. 5 mm long, spreading, thin-valved, smoothish; seeds numerous, elliptic-bicaudate, translucent, yellowish-brown, ca. 0.7-0.8 mm long, longitudinally multiribbed, some ribs crested with papillae.

Distribution and Flowering Season

Rocky moist woods, moist outcrops of acidic rock, usually in shade, Appalachians, mostly Blue Ridge, western North Carolina, eastern Tennessee; flowering from March through April.

Special Identifying Features

Of the symmetrical-flowered southeastern saxifrages whose filaments taper from base to apex, this is but one of two in Tennessee and the Carolinas that have bimaculate (2-spotted) petal bases. The other species, S. caroliniana Gray has filaments dilating distally (rather than tapering), has strongly clawed petal bases, and larger fruit.

Habitat and Management Implications

S. careyana frequents the moss mantle of wet, acidic rocks (phyllites, shales, granites, etc.) of steep slopes and cliff faces or ledges, is very often on the boulders and banks of plunging streams that empty into the larger streams and rivers. It may be in full sun of small clearings or areas of wet talus, but is always where moisture is high, nearly constant. Usually it is in the shade of a mixture of Canada hemlock, white pine, various hardwoods such as red oak, white oak, chestnut oak, black oak, hard maple, red maple, black locust, white ash, red hickory, bitternut hickory, various magnolia, yellow poplar, etc. The shrub layer is mostly ericaceous, containing Kalmia, Rhododendron, Leucothoe, Vaccinium, etc. Associated herbs are mostly carices, Scirpus, grasses in genera Poa, Bromus, Festuca, Panicum, and such forbs as Hepatica, Sedum, Mitchella, Krigia, Coreopsis, Senecio, Erigeron, Antennaria, etc. Many bryophytes, lichens, and ferns normally make up the surface of the thin mantle of soil or contribute the bulk of the organic matter the Saxifraga roots in. The habitat is steep, sensitive to erosion, thus it follows that heavy logging (where such is possible in that the terrain is often very steep) would, in addition to wrecking the slopes, open up the area to drying sun.

References

- Radford, A. E., C. R. Bell & H. E. Ahles. 1968. Manual of the vascular flora of the Carolinas, pp. 528-529. Chapel Hill, N.C.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 595-596. Chapel Hill, N. C.

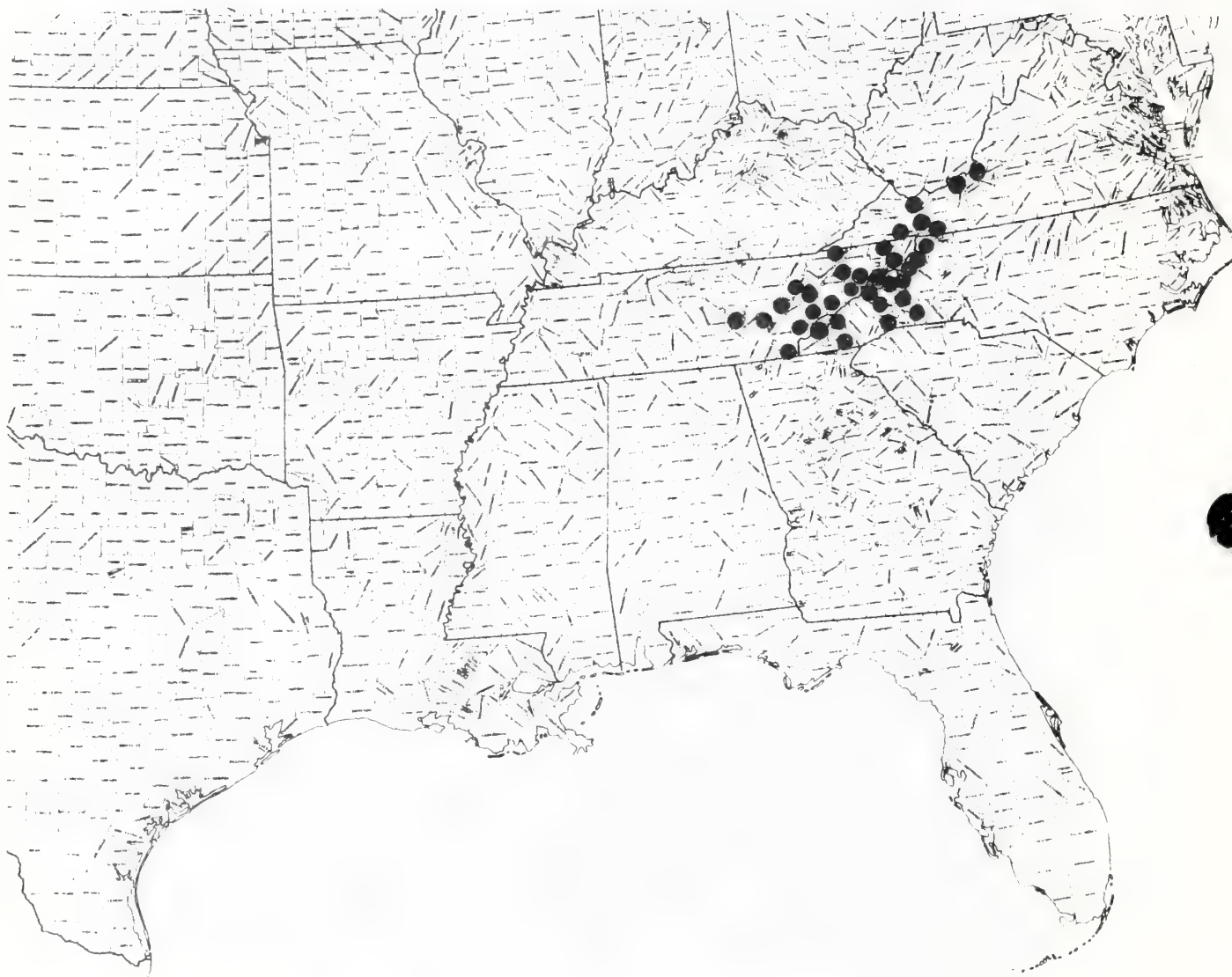
SPECIES Saxifraga careyana Gray. golden-eye saxifrage

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	NA	NA	NA		X	NA	
Damage					X			X
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Saxifraga careyana Gray



SAXIFRAGACEAE

Saxifraga caroliniana Gray. Carolina saxifrage
Micranthes caroliniana (Gray) Small

Technical Description

Rosette-forming, perennial herbs from short, fleshy stems, perennating by crown buds.

Leaves.--All larger ones basal, usually numerous, spreading, extremely variable in size (depending on depth, moisture and richness of substrate), stiffish, to 15 cm long, the petioles broadly linear, $1/3$ - $2/3$ the length of the blade, the backs broadly rounded, the upper surface flat or concave, proximally abruptly dilated to a clasping, brownish-villous base, distally slightly dilating into the blade; leaf blades flattish, somewhat succulent, sub-orbicular to oblong, ovate, apically rounded, the margins usually coarsely dentate, the teeth low-triangular or more narrowly triangular, tipped by an inconspicuous callus, the upper surface deep green, sparsely appressed-pilose with flattened pale hairs, the lower surface often paler or reddened, nearly smooth or scattered-pilose.

Scapes.--Erect, rigid and brittle, as variable in length as leaves, but consistently longer, terete, glandular-villous-pilose or pilose-glandular, usually bractless proximally but the inflorescence branches subtended by greenish, spreading or ascending, narrow linear or narrowly cuneate, sometimes apically toothed, bracts, these diminishing in size upward within the inflorescence.

Inflorescence.--Flowers arranged in a regularly forking compound of cymes, the slender branches spreading or slightly ascending, pilose-glandular, the whole compound usually oval in outline.

Flowers.--Regular, bisexual, on slender, stipitate-glandular pedicels of various lengths but rarely longer than 1 cm, each subtended by a small bracteole; hypanthium at anthesis very shallow; calyx lobes ca. 1.5 mm long, green, triangular, often reflexed in fruit, the narrow apex tipped by a reddish callus; petals 5, distinct, spreading, mostly 2.5-3.5 mm long, clawed, the blades narrowly oblanceolate or elliptic, white distinctly yellow bimaculate just above the blade base inside; stamens 10, spreading or erect, the slender filaments slightly clavate; ovary superior, the 2 distinct carpel bodies white, narrowly conic or lance-ovoid, from base to tip of slender, divergent styles ca. 2.5-3.0 mm long.

Fruit.--Follicles mostly 5-6 mm long from base to tip of persistent spreading style beak, the body lance-ovoid, excurved; seeds plumply short-cylindrical or ellipsoidal, 1-or-2-caudate, ca. 0.6-0.7 mm long, pale reddish-brown, translucent, longitudinally multiribbed, the ribs minutely papillate.

Distribution and Flowering Season

Shaded rocky ledges, slopes, cliffs, usually on acidic rocks, Blue Ridge and Valley and Ridge, western Virginia south into western North Carolina, northeastern Tennessee; flowering in May and June.

Special Identifying Features

S. caroliniana most closely resembles S. careyana, the only other species in the area that has yellow bimaculate petals (see writeup on S. careyana). The essential differences are the more stipitate petals, the narrowly clavate filaments of the stamens, and the larger fruit of the former.

Habitat and Management Implications

S. caroliniana is, like its close relative S. careyana, a plant of cool, shaded, surfaces of acidic rocks, and is usually rooted in a thin mantle of highly humified detritus mixed with moss. Most of its associate species are various carices, shade grasses, and a variety of ferns. The substrate is usually very moist, often misted with spray from plunging water, or variously supplied with seepage such as trickles down the shaded rocks. The terrain is invariably steep. The overstory varies somewhat, in some cases being primarily coniferous, usually with hemlock, white pine, mixed with hardwoods such as red oak, yellow birch, black birch, sugar maple, red maple, buckeye, basswood, magnolia, etc., and an understory largely ericaceous, composed of Rhododendron (usually R. maximum), Leucothoe, Kalmia, Vaccinium, etc. Clethra acuminata is often present, together with Rubus odoratus. However, in Valley and Ridge Virginia, the overstory may be largely of hardwoods, with very few conifers. In either event, the sites are steep, but locally may produce conifer and hardwood lumber of high quality. The slopes and soils are such that, if logging is heavy, much damage to the sensitive bluff habitat is done because of mechanical disturbance of the highly erodable soils, admission of too much light together with several woody weeds. The end result is that the character of the herbaceous vegetation is changed.

References

- Radford, A. E., C.R. Bell & H. E. Ahles. 1968. Manual of the vascular flora of the Carolinas, pp. 528-529. Chapel Hill, N.C.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 595-596. Chapel Hill, N. C.

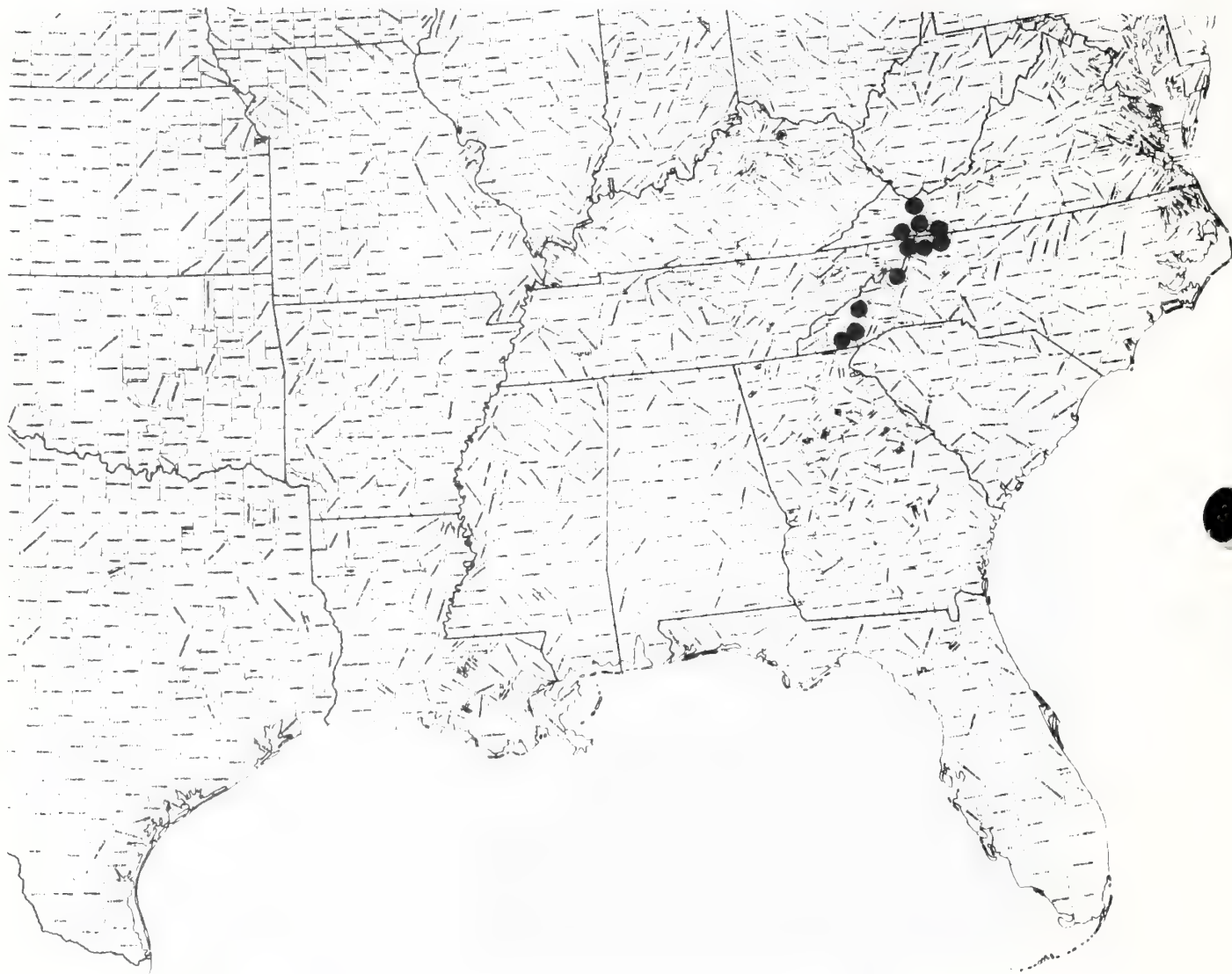
SPECIES Saxifraga caroliniana Gray. Carolina saxifrage

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	NA	NA	NA		X	NA	
Damage					X			X
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Saxifraga caroliniana Gray



SCROPHULARIACEAE

Penstemon dissectus Ell. Dissected beardtongue

Technical Description

Tufted perennial beardtongue from a fascicle of fleshy roots.

Stems.--Of two sorts, the floriferous ones numerous, radiating from a short crown, mostly 3-6 dm long, decumbent-based, then erect, stiffish, terete, minutely puberulent, proximally and distally purplish, at mid-stem greenish, slightly glaucous, usually unbranched below the inflorescence; sterile offshoots produced also, these usually strongly decumbent or procumbent, with trimorphic leaves.

Leaves.--Opposite, estipulate, those lowest on flowering stems short, scalelike, their margins coarsely pectinately fringed, grading evenly upward to full-sized cauline leaves, these in outline broadly oblong, ovate or even triangular, mostly 3-6 cm long, sessile with a clasping base, spreading or ascending, approximate, deeply dissected into several lineal or linear-spatulate, spreading segments, these sometimes distally deeply lobed or pinnately lobed, the segment tips with a blunt, reddish callus, the primary segment bases merging with a broadly winged midrib; segment margins very revolute; leaf surface above deep yellow-green, punctulate, below paler, punctate, only the midribs evident, these retrorsely scabro-puberulent; leaves gradually diminishing in size, becoming more distant upward on stem, the longest internode comprising the peduncle. Leaves of sterile shoots trimorphic, the lowest scalelike, those of midshoots as in flowering stems, those distal (and overwintering) evergreen, linear, oblong or spatulate, usually sinuate or low-toothed, rarely if at all narrowly lobed, mostly 3-6 cm long.

Inflorescence.--A terminal, stiffly erect, panicle on a leafless purplish, small-bracteate peduncle of varied length, but up to 1 dm long, the branching opposite and ascending, the lower branches longest, all branches naked at the base, toward tips producing asymmetrical, few-flowered cymes; pedicels slender, stiffish, terete, retrorsely puberulous, purplish, 5-15 mm long.

Flowers.--Perfect, zygomorphic, usually spreading horizontally or suberect; sepals 5, green rimmed with red, slightly unequal, the calyx broadly campanulate, ca. 5 mm long, the lobes ovate-triangular, the lowest longest, all acute, the margins glandular-ciliate, entire or denticulate apically, the surface externally stipitate-glandular; corolla gamopetalous, zygomorphic, 2.5-3.0 cm long, the short tube ca. 5 mm long, 3-4 mm broad, widening into a campanulate, oblique-orificed throat ca. 1.5 cm long, 1.0-1.2 cm wide at orifice, the 5 subequal, nearly round lobes all nearly equally spreading, the lowest slightly longer, projecting more, the corolla lively lavender-rose with deeper lines, externally stipitate-glandular, internally smooth save for a white-bristly pilosity at base of lower 3 lobes; stamens 5, the longest one a linear-clavate stamin-

ode that is bristly-white-hirsute distally, all arising at the corolla tube, the fertile filaments arching downward, slender, terete, basifixed to ellipsoidal, divergent purplish anther sacs, these muriculate, sometimes with a few bristly hairs along the dehiscence line; ovary superior, 2-locular, lance-ovoid, smooth, about as long as the calyx, tapering into a linear, up-curved style, this terminating in a short stigma.

Fruit.--Capsule lance-ovoid, tapering to an acuminate beak, ca. 1 cm long, smooth, brown, the valves somewhat woody; seeds numerous, asymmetrically broadly wedge-shaped and prismatic, ca. 2.0-2.5 mm long, dark brown, minutely alveolate (honeycombed).

Distribution and Flowering Season

Gritty sands and gravels of outcrops and environs of same, Coastal Plain Georgia; flowering from late April to early June.

Special Identifying Features

This is the only Penstemon in the southeastern area that has deeply dissected leaves.

Habitat and Management Implications

P. dissectus appears to be confined to outcrops of siliceous rock or of sandy gravelly soils nearby. It may be abundant very locally on outcrops of the Altamaha Grit, a ferruginous gravelly sand that is known to have on it several other rare endemics (including Elliottia, Marshallia ramosa, Physostegia veroniciiformis, Rhynchospora punctata, Hypericum lloydii, Arenaria uniflora, Talinum teretifolium, etc.) The aspect is savanna, the overstory on the outcrops and thin sandy soil around them being a scattering of longleaf pine, bluejack oak, sandhills post oak, turkey oak, black oak, blackjack oak, persimmon, sassafras, dogwood, black cherry, etc. Among the shrubs present are many ericads such as Vaccinium arboreum, V. floridanum, V. myrsinites, V. stamineum, Gaylussacia dumosa, G. frondosa, and an abundance of Rubus cuneifolius, Smilax (several kinds). The sites are dry much of the year but have some seep areas or depressions in the rock where there is moist to wet inwash and thus some very localized bogs develop. The wiregrass Aristida stricta is common in the Penstemon sites, which are dry, and most of the associate species of herbs are those that appear on dryish sands. The system is fire-disclimax and much of the Penstemon area shows a current to comparatively recent evidence of burning which tends to maintain the savanna. Protection from fire would of course increase the percentage of woody and herbaceous competition, which would both crowd and shade out the Penstemon, a plant of full sun or light shade. Some Penstemon areas I have visited have been planted to rows of slash pine, the result being that this

beardtongue disappears as the pine crowns close.

References

Small, J. K. 1933. Manual of the southeastern flora, pp.
1201-1205. Chapel Hill, N. C.

SPECIES Penstemon dissectus Ell. dissected beardtounge

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: in some localities this plant is on rock, thus mechanical site preparations cannot be applied

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Constemon dissectus Ell.



VIOLACEAE

Viola egglestonii Brainerd. Eggleston's violet

Technical Description

Perennial, rosulate, smoothish herbs from a fleshy, stoutish-cylindrical, erect or ascending rhizome 0.5-1.0 cm thick.

Leaves.--All basal; stipules linear-triangular, pale green tinted with pink, thin, entire or remotely ciliate; petioles various in length, those of earliest leaves usually shorter than the blades, increasingly lengthening through the season and longer than the blades, smooth, or sparingly villosulous, fleshy, half-terete, the backs rounded and ribbed, the inner side (ventral) usually concave; blades mostly 1.5-6.0 cm long, pale green on both faces, the earliest ones mostly broadly ovate to suborbicular or reniform, broadly acute to obtuse or rounded, the margins crenate or crenate-serrate, the bases truncate or cordate, also attenuated on the petiole; later leaves becoming progressively more dissected, usually involving a seasonal series from triangular and more lacerate-serrate or incised, with bases truncate-hastate, to ovate and deeply palmatifid, the (5-) 7-11 segments narrowly oblanceolate or spatulate, or with the medial segment broadest, sometimes itself broadly oblong, ovate or elliptic with the laterals few, basal, narrow, saliently spreading, the lobe margins low-serrate, the blade base cuneate to truncate, or with lower lobes reflexed; surfaces usually glabrous.

Inflorescence.--Flowers several per plant, solitary at peduncle tips and of two sorts, petaliferous ones (chasmogamous) showy, appearing early in the season on ascending or erect peduncles, giving way later in the season to inconspicuous cleistogamous ones on horizontally oriented peduncles; peduncles of chasmogamous florets slender, about as long as the leaves, bibracteolate, the small, subulate, red-tinged bracts appearing about midway up, the peduncle apex bent to the flower.

Flowers.--Chasmogamous flowers zygomorphic, bisexual; sepals 5, distinct, narrowly triangular, slightly unequal, the longest ca. 9 mm long, broadly auricled at base, projecting forward in the flower, thinnish, pale green with maroon tints, in fruit with tips spreading-reflexed; petals 5, distinct, the lowest somewhat larger, ca. 1.5 cm long, basally with a saccate spur that projects backward between the bases of the lower pair of sepals, the blade obovate, projecting forward, the lateral petals narrower, projecting forward and outward, internally bearded medially toward blade base, the upper pair of petals broadest and apically most spreading; petal surfaces a lively blue-violet in the blade, grading to pale blue or nearly white with deep blue-violet veins toward the base (this giving the flower a distinct "eye"); stamens 5, the filaments very short, broad, each projecting beyond a broadly oblong, pale, introrse anther to form a triangular scale, the whole structure

forming a cylinder around the style; ovary superior, 3-locular, the single style apical, bent slightly above its base and distally dilated into the capitate stigma.

Fruit.--A broadly oblong, pale yellowish-green, loculicidal capsule 1.0-1.4 cm long, the numerous seeds narrowly obovoid, ca. 2 mm long, smooth, pale brown.

Distribution and Flowering Season

Heavy, thin, soils over limestone, glades and clearings, Interior Low Plateau, middle Kentucky south through middle Tennessee into northwestern Georgia and northern Alabama. Chasmogamous flowers from early March into May; cleistogamous flowers from May to frost.

Special Identifying Features

The stemless blue violets probably comprise the most difficult taxonomic problem remaining in the southeastern U.S.A. There are several other "species" that have similar patterns of variation of leaf and some doubtlessly hybridize with V. eggles-tonii, particularly on disturbed habitat. The most likely contaminant is V. palmata (including V. triloba, V. sororia in some treatments) with V. affinis LeConte (incl. V. papillionacea, V. missouriensis, etc.) a close second. Taxonomically however, V. egglestonii is most like the palmatifid-leaved V. pedatifida, a prairie species with which it does not share range. The only consistent difference between the two is in the behavior of the peduncle of the cleistogamous flower, which in V. egglestonii is prostrate, sometimes buried shallowly in the substrate or creeping over the surface and which in V. pedatifida is erect or suberect. It differs from most species in the V. palmata complex in that, in the latter the young leaves are generally somewhat pubescent, and there is usually some pubescence even in older foliage.

Habitat and Management Implications

V. egglestonii is frequent or fairly common in most of the open limestone glades of middle Tennessee, rather rare and local elsewhere in its small range. Its soil preferences are for a dark, humified clay, a product of the in-place and transported weathered limestones which always underlie the plants. Common herbaceous associates are those typical of limestone glades and include Sporobolus, various Dichanthelium Panicum, Carex, Juncus filipendulus, Arenaria patula, Satureja, Scutellaria parvula, Delphinium virescens, Sedum pulchellum, various Leavenworthia, Lesquerella, Petalostemon gattingeri, Psoralea subacaulis, Astragalus tennesseensis, Onosmodium molle, Lithospermum canescens, Opuntia compressa, etc. The site ranges from very moist to quite dry in a single season. As do other species of open limestone

glades, this violet tends to disappear as the surrounding woody vegetation invades, so that as Juniperus (the common first arborescent invader) close crowns, V. egglestonii becomes scarce and is totally absent by the time the overstory succession reaches climax. Thus, as is true also of other open glades plants, V. egglestonii was probably maintained historically by a combination of natural woods fires and erosional forces that would tend to create either outcrops or shallow soils. In that the plants are cormophytic and low, they tend to persist, even increase, under conditions of extreme disturbance such as lot development, high grazing intensity, etc.

References

- Brainerd, Ezra. 1910. Five new species of Viola from the South. Bull. Torr. Bot. Club 37: 523-527.
- _____. 1921. Violets of North America. Vermont Agric. Expt. Sta. Bull. 224. 205 pp. Burlington, Vt.
- Russell, N. H. 1965. Violets (Viola) of central and eastern United States: an introductory survey. Sida 2 (1): 1-113.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 884-894. Chapel Hill, N. C.

SPECIES Viola egglestonii Brainerd. Eggleston's violet

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			X	
Damage								
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Viola egglestonii Brainerd



ACANTHACEAE

Justicia mortuifluminis Fernald

J. umbriatilis Fernald (1941), not S. Moore,
Journ. Bot. 11: 216. (1913)

Status: Endangered?

Technical Description:

Perennial, strongly clonalizing herb, perennating by elongate, deepset, forking, pale-stoloniferous rhizomes, these at first ca. 3 mm thick, later thickening to 4-6 mm.

Stems: erect or with short-decumbent bases, to 6 dm tall, stiffish, simple or branching from lower nodes, slender, proximally with brown or purple tints, subterete, upwardly becoming angulately sharp-ridged, the ridges decurrent from the petiole bases, the surfaces light yellow-green, smooth save in inflorescence where ridges scabro-puberulent.

Leaves: opposite, on 7-11 nodes, estipulate, the lowermost smallest, more spreading, sessile or short-petiolate, the largest at mid-stem or above, erect or ascending, narrowly elliptic, oblanceolate or elliptic-oblong, narrowly acute or acuminate, the apex narrowly rounded, the margin entire or undulate, scabro-ciliate, the base attenuated nearly to petiole base, the surface smooth, dark green above, paler beneath, the venation pinnate-arcuate, the midrib above medially grooved, the veins below somewhat raised.

Inflorescence: Most mid and upper leaves bearing in their axils arching-erect peduncles, these slender, angulately ribbed, the lowest longest, 10-15 cm long, the upper most as short as 3-4 cm long, bearing apically compact, subcapitate, strongly bracteate spikes, the bracts in pseudowhorls at base of flowers, triangular, greenish, shorter than the calyx tubes, the flowers suberect and strongly overlapping.

Flowers: bisexual, the corolla very zygomorphic; sepals 5, subequal, at anthesis ca. 1 cm long, joined at base into a short, subscarios tube, the lobes linear-elliptic, erect or slightly spreading, narrowly and sharply acute, green with only midnerve evident, the margins narrow, pale, minutely scabrid; corolla variable in length and lobation but mostly ranging from 1.0-1.5 cm long, strongly bilabiate, the tube ca. 8 mm long, the upper lip oblong, arching forward, 5-6 mm long, apically broadly rounded, emarginate or subtruncate, the lower lip 7-9 mm long, broadly obtriangular, spreading downward, strongly 3-lobed, the central lobe slightly longest and widest, the laterals oblong-ovate or oblong-elliptic, diverging at a slight angle, the surface smooth, pale lilac with darker veins save for the nearly white tube base and the upper medial surface of the midlobe of the lower lip, this raised to a palate, which is white, strongly mottled peripherally with deep lilac spots and lines; stamens 2, epipetalous, the white slender flattened filaments borne laterally on the corolla tube on line with the lip sinuses, arching somewhat up under the upper corolla lip, the anther connective very dilated, laterally flattened, lanceolate-curved, the 2 anther sacs linear, one borne low on the connective edge and opening inward, the other borne supapically on the outer edge of the connective

and opening away from the stigma; ovary superior, bicarpellate, narrowly lance-ovoid, the slender style terminal, arching up under the upper corolla lip and at the level of the anthers producing 2 low stigmatic lobes, 1 terminal and 1 subterminal-lateral.

Fruit: Ripe capsule 1.2-1.4 cm long, the base with a laterally flattened stipe ca. 5 mm long, the body broadly oblong, dorsiventrally flattened (parallel to partition), acuminate, the wall greenish-brown, firm, splitting into 2 valves loculicidally; seeds few, orbicular-reniform, laterally flattened, ca. 3 mm wide, dark brown, minutely pebbled, the funiculus with a narrow lateral extension curled about the lower edge of the seed.

Distribution and Flowering Season:

Alluvial woodlands, quiet backwater sloughs, Coastal Plain, southeastern Virginia; flowering from June through July.

Special Identifying Features:

Fernald's description of this "species" produces an image of what an ideal hybrid between J. americana and J. ovata would be like. The common Water-willow, J. americana is taller (sometimes to 1 meter tall), stouter-based, stouter rhizomed, the rhizomes shallow and producing slender surficial stolons, the leaves are narrower, the inflorescence is very dense, headlike, produced on very elongate peduncles, the corollas are smaller, with the upper lip somewhat spreading-recurved, the lower lip has the median lobe constricted toward its base, the laterals are more spreading; J. ovata on the other hand is lower, the rhizomes more slender, the leaves broader, mostly broadly elliptic, ovate or obovate, the inflorescences are fewer-flowered with the flowers more loosely arranged, the lower blooms more distant as fruit forms. Seed characters appear to be intermediate. It is of some interest to note that J. mortuifluminis has been found along the Blackwater and Nottoway Rivers in southeastern Virginia, the northernmost area for J. ovata, but also where some suitable habitat for J. americana, which is far the most ubiquitous of these wetland taxa. I have inspected several sites for what keys to J. mortuifluminis and note that some clones agree well with the original description whilst others grade toward either J. americana or to J. ovata. The situation appears to be that, where J. americana and J. ovata come into contact along the slow, tidally influenced rivers of southeastern Virginia, intermediate morphologies have developed, and these appear to be back-crossing with parental types. This will make an interesting proof if such has not already been done. It is also worthy of note that morphologies similar to J. mortuifluminis appear in the Gulf Coastal Plain, where J. ovata and J. americana also overlap occasionally. It would seem that the taxon is weak.

Habitat and Management Implication:

J. mortuifluminis, as the name implies, is found in deadwater swamps. Particularly good sites for it are still to be found in the Nottoway system around Franklin. The river itself is typical of a rather slow flowing stream, sinuous, wine-tinted, in places with a broad floodplain with large shallow-bottomed sloughs interrupted by frequent natural levees as well as by slow-flowing tributary streams.

The substratum is in places silty muck, in others a fine silty sand, in any event overlying sandy alluvium. There are large beds of Saururus, Sagittaria, Scirpus, Rhynchospora, Pontederia, Sparganium, Leersia, Glyceria, Panicum, Peltandra, robust carices, Polygonum, Penthorum, etc. The overstory is prevalently cypress-tupelo, with Nyssa biflora, Acer rubrum, Liquidambar, Salix, Populus, Fraxinus caroliniana, F. pensylvanica, F. tomentosa, Platanus, Carya aquatica, various willow oaks, Overcup Oak, Persimmon with an understory of Itea, Cephalanthus, Sambucus, Cornus, Viburnum, etc. The Justicia frequents frequently inundated first bottom, forms particularly large stands where tributary streams course through the bottoms or along cutoff sloughs. It is definitely a shade plant.

This habitat suffers most from clearcutting of the cypress and hardwoods. Following a wholesale cut of such bottoms there is often a strong shift of species, evinced by a rapid increase of rank, weedy herbaceous and woody plants, turning such places into jungles in which the Justicia may no longer grow.

References:

- Fernald, M.L. 1941. Another century of additions to the flora of Virginia. *Rhodora* 43: 635-659.
- _____. 1942. Justicia mortuifluminis, in *Rhodora* 44: 92.
- _____. 1950. Gray's manual of botany, ed. 8, pp. 1308-1309.

SPECIES: Justicia mortuifluminis Fernald

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy	NA	NA	NA	NA		X	NA	
Damage					X			
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Range of:

Justicia mortuifluminis Fernald



Oxypolis canbyi (Coult. & Rose) Fern.O. filiformis (Walt.) Britt. var. canbyi Coult. & Rose

Status: Endangered

Technical Description:

Perennial, smooth, aromatic (smelling faintly of dill), strongly clonalizing umbellifer, increasing by numerous fleshy, elongate, pale, stoloniferous rhizomes.

Stems: erect or ascending, slender but stiffish, terete, finely fluted, arising from scaly buds at tips of previous year's rhizomes, fistulose, to 1.5 meters tall, the decumbent base frequently rooting at nodes, the nodes there approximate, the internodes mostly 5-10 mm thick toward plant base, gradually tapering and more elongate upward into inflorescence, usually branching only well above mid-stem, the branches arching-ascending, forking or ternately rebranching, forming a candelabralike narrow to broad compound of several to many umbels, the surface a pale green, toward stem base purplish or pinkish. Leaves: alternate, phyllodial, terete, nodose-septate, the lower ones longest, frequently to 2 or 3 dm long or more, narrowed abruptly from the broadly clasping base, then gradually tapering to the conical, acute apex, upwardly gradually diminishing in length into the inflorescence, there overtopped by umbels in anthesis, the surface finely fluted as in stems, dull green.

Inflorescence: an indeterminate compound of compound umbels, the primary peduncles axillary, elongate, arching-ascending or erect, stiffish, terete, mostly 5-10 cm long, the secondary peduncles (primary rays) 7-12, slender but stiffish, mostly 2-3 cm long, subtended by a whorl (involucre) of several, spreading, apically upcurved, linear-setaceous, green bracts 1.0-2.5 cm long, these usually grooved on the upper side; secondary umbels mostly ca. 1 cm high, to 1.5 cm broad, the slender, stiff pedicels numerous, 2-7 mm long, subtended by an involucre of green, linear-subulate bractlets 3-10 mm long; inner florets of some umbels strictly male, some outer florets strictly female.

Flowers: bisexual and/or unisexual, regular; sepals 5, narrowly triangular-subulate, pale green or tinged with red or pink, spreading, mostly ca. 0.5 mm long, articulated to hypanthial rim and rarely persisting on ripe fruit; petals 5, white, ca. 1.2-1.3 mm long, short-clawed, the broadly ovate-orbicular blade strongly incurved with the back concave, the narrow apex curved inward, nearly touching the strongly raised mid-nerve; stamens 5, alternating with petals on hypanthial rim, the filaments white, linear-subulate, terete, to 1.5 mm long, apically incurled so that, while anther is basifixed, the dorsal side of the connective lies against the filament apex, the anthers nearly round, ca. 0.5 mm long, pale yellowish-white or tinged with pink, bilocular; ovary inferior, bicarpellate, the hypanthium at anthesis ca. 0.5-0.6 mm high, in outline narrowly campanulate, somewhat compressed laterally and indented along the edges of the commissure, longitudinally low-ribbed, green tinged with pink, the stylopodium (enlarged

nectariferous style bases) fleshy, yellowish, conical, ca. 0.5 mm high, the short, fleshy style branches excurvate at anthesis, the stigmas slightly capitate.

Fruit: Schizocarp broadly obovate or ellipsoidal in outline, strongly compressed dorsiventrally, mostly 4-6 mm long, the apex strongly notched, the fruit often bowed inward through unequal and greater development of the outer mericarp, the outer face of each mericarp with 3 evident but narrow longitudinal ridges over the low-convex, elliptical seed cavity and with slender, longitudinally oriented, reddish, oil tubes in the broad intervals, also marginally thickened so as to make the border of the mericarp much thicker than the seed cavity (see plate!); medial surface over seed cavity often sparsely but evidently muricate.

Distribution and Flowering Time:

Borders and shallows of cypress-Pond Pine ponds, sloughs, shallow savanna ponds and ditches, infrequent, Coastal Plain, Delaware (where probably extirpated), South Carolina, Georgia; flowering from late May through July.

Special Identifying Features:

O. canbyi has been placed by some as a variety of O. filiformis (Walt.) Britt., a more widespread, superficially similar, species of the Atlantic and Gulf Coastal Plain, but this is probably because both species are often collected without getting the rootstock or the mature fruit. The former is at once distinguished by its strongly clonalizing habit, in that it develops strong, spreading, fleshy rhizomes; O. filiformis produces no rhizome whatever. O. canbyi has much more slender, whiplike, elongated lower leaves, while those of O. filiformis are stiffer, often stouter, tend to have a stronger taper, are more fleshy. O. canbyi has a totally different looking fruit in that the edges of each mericarp are strongly distended under the prominent ribs by thickenings of corky material so that the margins of each schizocarp are actually thicker than is the central area over the seed; on the other hand the fruit of O. filiformis are thicker medially than marginally. In that there are such strong differences it would be far more consistent with the taxonomy of the genus to consider the two taxa as distinct species.

Habitat and Management Implication:

I have seen several populations in Georgia and the habitat is fairly consistent, namely shallow ponds in pinelands or shallow, grassy-sedgey sloughs. Such are usually peat-muck-bottomed, rimmed with growth of Pond Cypress, Pond Pine, Swamp Black Gum, Ogeche Plum, with some undergrowth of Stillingia aquatica, Cephalanthus, Crataegus, Ilex myrtifolia, Itea, Sambucus, Smilax, Rosa, etc. Grasses and sedges such as Panicum hemitomon, Manisuris, Rhynchospora inundata, R. macrostachya, R. perplexa, R. microcarpa, R. tracyi, Eleocharis (several species) dominate, are interspersed with Eriocaulon compressum, several Xyris, Polygala cymosa, Hypericum denticulatum, Proserpinaca, Rhexia virginica, R. aristosa, various Ludwigia, Asclepias lanceolata, Hydrocotyle, Bacopa caroliniana (with its odd turpentine stink!), various Sabatia, and many

composites, some of the more consistent being Pluchea rosea, Sclerolepis, Coreopsis nudata. Shrubby Hypericum such as H. fasciculatum, H. myrtifolium may sometimes form large patches.

All such plants are the sort that thrive on peat-muck substrates that usually are at least wet, but which may, during dry cycles be exposed for brief periods. During such dry periods the former shallows may burn, this doubtless maintaining or increasing grass-sedge formations.

Several stations for O. canbyi have been lost in recent years. In many instances the shallow pineland ponds have been drained and converted to lowland pasture, with even the few moist areas remaining becoming dominated by pasture grasses. In other cases the ponds have been converted to stock tanks as well as reservoirs for irrigation water and under such management, which involves deepening by dredging as well as ditching, the Oxypolis is lost. In still other cases the drainage is done so as to provide drier sites either for cropland or for pine plantation, in either event resulting in total destruction of the habitat.

References:

Coulter, J.M. & J. N. Rose. 1900. Monograph of the North American Umbelliferae. Contribs. U.S. Nat. Herb. 7 (1): 1-256.

Fernald, M.L. 1939. Oxypolis canbyi (Coult. & Rose) comb. nov. in Rhodora 41 (484): 139.

_____. 1950. Gray's manual of botany, ed. 8, pp. 11-2-1103.

SPECIES: Oxypolis canbyi (Coult. & Rose) Fernald

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X	X	X			X	
Damage No Lasting Effect						X		X
Beneficial if Done Properly	X				X			

Other Comments: Drainage of site is fatal to this species!

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Oxypolis canbyi (C. & R.) Fern.



APIACEAE

Ptilimnium nodosum (Rose) Mathias. N.C.N.

Harperella nodosa Rose

H. fluviatilis Rose

H. vivipara Rose

Ptilimnium viviparum (Rose) Mathias

P. fluviatile (Rose) Mathias

Technical Description

Mostly annual, sometimes producing rosettes from buds off lower nodes, the roots shallow, diffuse-fibrous, the plants with a faint scent of dill.

Stems.--Erect from short-decumbent base, fistulose, from 1 to 12 dm high (size dependent on site and spacing of plants), stiffish or weak, solitary or tufted, the lower nodes numerous, often rooting, the erect portion toward base mostly 3-5 mm thick, subterete, multicostate, purplish-tinged, upwardly becoming strongly angulately ribbed and green, toward base usually unbranched, from mid-stem up strict to near apex or alternately (rarely oppositely) branching, with branches arching-ascending to nearly erect.

Leaves.--Phyllodial (actually compound but reduced to a mere rachis), tubular, lineal with broadly clasping bases, the rosette and lower ones often 3-4 dm long, variable in width, some slenderly linear, some broader, fleshier, 3-5 mm thick, in any case cross-septate at regular intervals, sometimes constricted at septations in thicker leaves; phyllodia becoming shorter, more distant upward on stem, grading gradually to short-linear bracteal leaves.

Inflorescence.--A compound of compound umbels, on the stricter plants these rather few and close together at tips of essentially axillary peduncles, these mostly erect, up to 1 dm long, mostly shorter; primary rays 5-15, stiffly erect or spreading, 5-20 mm long, subtended by an involucre of short, spreading, subulate or lance-subulate bracts rarely longer than 0.5 mm, the secondary rays (pedicels) mostly 5-15, 1-5 mm long, subtended by a weak involucre, these bracts mostly under 0.5 mm long.

Flowers.--Bisexual or unisexual, regular, each small umbel containing both perfect and male florets the male usually toward center and shorter-pedicelled; hypanthium of bisexual florets at anthesis ca. 0.5 mm high, broadly campanulate, indented along the commissure, the round-backed sides longitudinally ribbed; calyx lobes 5, narrowly triangular-subulate, green or tinged with rose, ca. 0.5 mm long, spreading, sometimes incurved-tipped, persisting on fruit; petals white, short-clawed, the blades somewhat fleshy, suborbicular, strongly incurved, apically short-acuminate, the mid-nerve somewhat raised above; stamens 5, the spreading to incurved, white, tapering filaments 0.5-1.0 mm long, the ellipsoidal-oblong bilocular anthers yellowish to reddish, dorsifixed, introrse, to 0.5 mm long; ovary inferior, contained in perianth tube, crested by a bilobed, low-conic yellowish to pale pink stylopodium 0.2 mm high, the style branches slenderly linear, spreading, 0.3-0.4 mm long,

Fruit.--Schizocarp broadly elliptical in outline, 1.5-2.0 mm long, slightly compressed laterally (broad plane of fruit perpendicular to commissural plane), thus fruit broadly oblong in cross section; mericarps in cross-section semicircular, along the commissural border with an elevated, spongy-thickened band, the rounded backs with

3 strong, green or tan longitudinal ribs, the intervals broader, thin over the seed and with solitary oil tubes, dark-reddish-brown; commissural face of mericarp flat or slightly concave, except for the pale spongy border a dark green or reddish-brown, the oil tubes double.

Distribution and Flowering Season:

Wet bars, shoals and seepy banks of rocky, fast-flowing streams, wet savanna, shallow pineland pools, ditches and ditchbanks, very local, inner and outer Coastal Plain, Piedmont, and locally in a few isolated Appalachian localities. Flowering mostly from May into July, intermittently to the end of the growing season.

Special Identifying Features:

In that populations of quill-leaved Ptilimnium fluviatile (Rose) Mathias show overlapping variation in all characters with equally variable populations of P. nodosum, and because many of these characters may vary because of external environment, (i.e. pond versus riverine habitat, substratum character, spacing of plants, amount and character of competing vegetation) and also because none of the characters supposed to distinguish the species have much geographical basis, it is suggested that the oldest available name be used for a complex formerly thought to contain three species (P. nodosum, P. fluviatile, P. viviparum (Rose) Mathias). That name is P. nodosum.

Habitat and Management Implications

The few existing localities known for P. nodosum in the Coastal Plain appear to be shallow pineland ponds and low savanna meadow. The type locality of the species, a shallow pond near Ellaville, Schley Co., Georgia, no longer exists, and other habitat in the area of Unadilla in Dooly Co., Georgia appears also to have been destroyed. In Aiken Co., South Carolina, two localities are still known; one an area of grassy savanna near Montmorenci is nearly destroyed and the other, a shallow pond (doline) near Monetta, while disturbed, is still in good condition. The central habitat seems to be what is called by the local people "high pond". Such high ponds are shallow, ringed by willow oaks, swamp black gum, sweet gum, pond cypress, and sometimes pond pine. The soil of the pond edges and bottom is typically a peat-muck, this overlying fine black sand or sandy-silty-clay, which in turn overlies solution rock. Such ponds have unpredictable shorelines, with water sometimes extending into the bordering forest, at others retreating to the center of the ponds or altogether disappearing. The dominant grass is Panicum hemitomon, with an interspersions of other panicums, cut-grass, Sacciolepis, and sedges such as Rhynchospora perplexa, R. microcarpa, R. tracyi, R. inundata, R. macrostachya, etc., Carex walteri, C. lupulina, Eleocharis tricostrata, E. melanocarpa, E. microcarpa, E. baldwinii, Psilocarya, Dichromena

colorata, Fimbristylis, admixed with Xyris iupicai, X. smalliana, X. fimbriata, Eriocaulon, Juncus, Sagittaria; dicots often include Hypericum fasciculatum, H. denticulatum, H. myrtifolium, Rhexia virginica, R. mariana, R. aristosa, Proserpinaca pectinata, various Ludwigia such as L. spathulata, L. pilosa, L. sphaerocarpa, L. linearis, Centella, Hydrocotyle, Lindernia, Bacopa caroliniana, Sabatia, Lobelia, Polygonum species. Composites may include Coreopsis nudata (in Georgia), C. rosea (in South Carolina), Rudbeckia mohrii, R. nitida (in Georgia). Sclerolepis is nearly always present and is abundant.

In the riverine sites of Alabama, upland North Carolina, Maryland, Kentucky and West Virginia it is either in or on the immediate banks of swift flowing, clear and rocky streams. In early spring its rosettes are reminiscent of those of some Juncus. The substrate reaction is acidic, its associate species are often the same genera of herbs as found with it in the Coastal Plain. In some of the Alabama localities, particularly along the Little River, it may be abundant locally and may form nearly pure stands. It is never found in heavy shade, but the streams in whose shallows it grows all flow through mixed mesophytic or oak-hickory-pine forest. It is always found in wet soil situations thus it is not suprising that it thrives in spite of periodic flooding so long as its substrate is not washed away. Flooding in the sort of healthy streams it frequents, whose watersheds are usually well timbered, is usually of short duration. However heavy logging of the steep slopes and headwater ravine areas would do much to disrupt such short flood cycles and could reduce such populations by extending the amount and duration of flooding. Much of this riverine habitat has been destroyed through dam building. The Coastal Plain sites are, as stated earlier, much reduced. The pineland ponds and wet savanna habitats are everywhere being drained either in the process of preparation for pine plantation or row crop agriculture or "improved" pasture.

References

- Easterly, N. W. 1957. A morphological study of Ptilimnium. Brittonia 9: 136-145.
- Kral, R. 1981. Notes on some "quill"-leaved umbellifers. Sida 9 (2): 124-134.
- Mathias, M. E. 1936. Studies in the Umbelliferae V. Brittonia 2 (3): 239-245.
- Radford, A.E.H.E. Ahles & C. R. Bell. 1968. Manual of the vascular flora of the Carolinas. Chapel Hill, N.C.
- Rose, J.N. 1905. Two new umbelliferous plants from the coastal plain of Georgia. Proc. Nat. Mus. 29: 441-442.
- _____. 1911. Two new species of Harperella. Contribs. Nat. Herb. 13: 789-790.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 977-978. Chapel Hill, N. C.

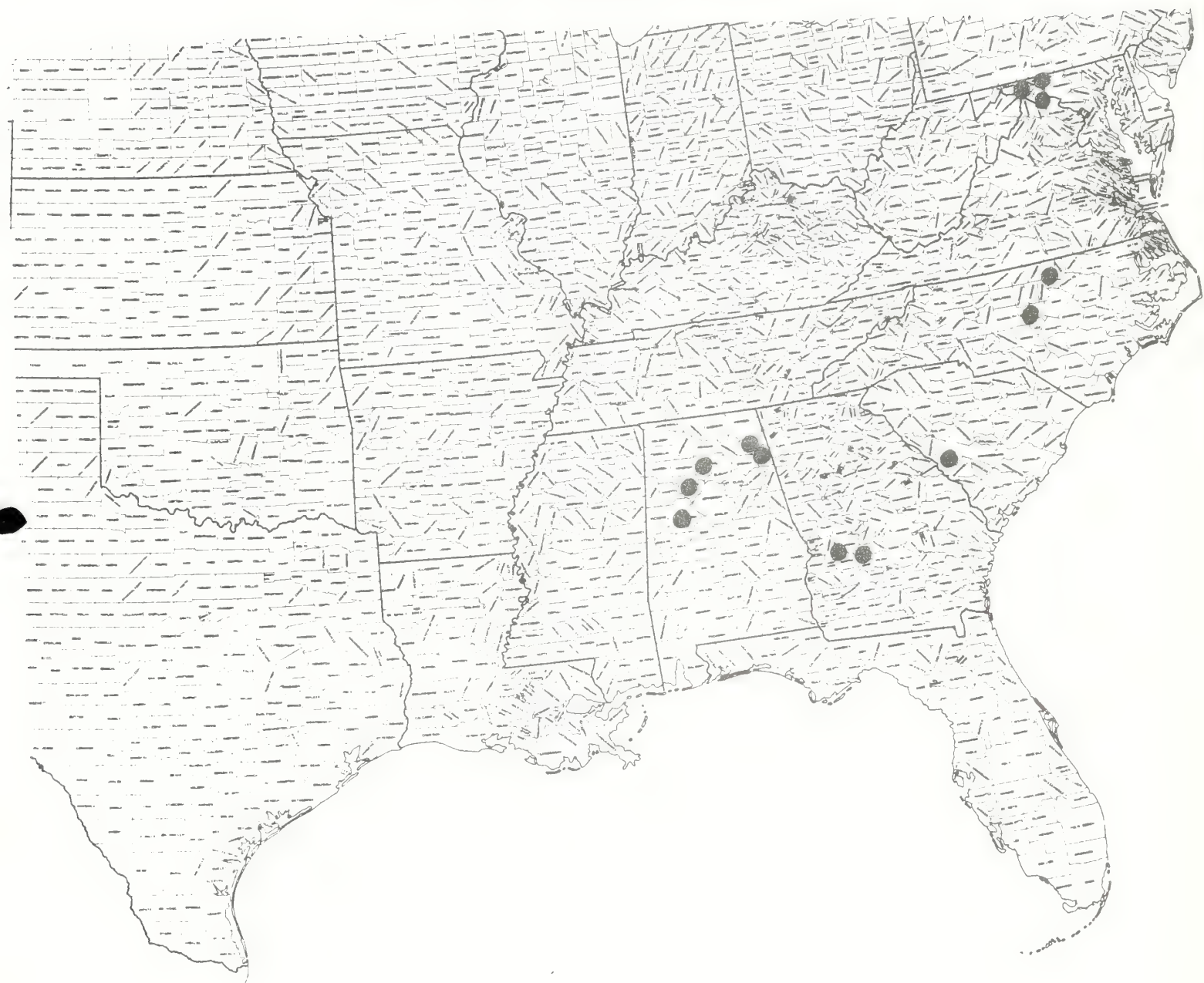
SPECIES Ptilimnium nodosum (Rose) Mathias. N.C.N.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	X-*	X	X			X	X
Damage								
No Lasting Effect								
Beneficial if Done Properly					X	X		

Other Comments: *any site preparative methods involving drainage or soil disturbance would eliminate this species. riverine habitat best protected by careful watershed management. avoidance of pollution.

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Ptilimnium nodosum (Rose) Mathias



APIACEAE

Ptilimnium nodosum (Rose) Mathias

Harperella nodosa Rose

Status: Endangered

Technical Description:

Annual or short-lived perennial with a faint dill odor, perennating by buds from lower nodes, the roots shallow, diffuse-fibrous.

Stems: Erect from decumbent base, mostly 6-9 (-12) dm tall, solitary or in tufts, the lower nodes numerous, often rooting the erect portion toward base mostly 3-5 mm thick, subterete, multicostate, fistulose, purplish-tinged, upwardly becoming strongly angulately ribbed and green, toward base usually unbranched, from mid-stem up strict to near apex or alternately (rarely oppositely) branching, the branches arching-ascending to nearly erect.

Leaves: Phyllodial, tubular, linear with broadly clasping bases, the lower often 3-4 dm long, variable in width, some slenderly linear, some broader, fleshier, to 3 mm thick, in any case cross-septate at regular intervals, sometimes constricted at septations in thicker leaves; phyllodia becoming shorter, more distant upward on stem, grading gradually to short-linear bracteal leaves.

Inflorescence: a compound of compound umbels, on the stricter plants these rather few and close together at tips of essentially axillary peduncles, these mostly erect, from 5-10 cm long; primary rays mostly 10-15, stiffly erect or spreading, 5-20 mm long, subtended by an involucre of short, spreading, subulate or lance-subulate bracts rarely longer than 0.5 mm, the secondary rays (pedicels) mostly 10-15, 1-5 mm long, subtended by a weak involucre, these bracts mostly under 0.5 mm long.

Flowers: Bisexual or unisexual, regular, each small umbel containing both perfect and male florets, the male usually toward center and shorter-pedicelled; hypanthium of bisexual florets at anthesis ca. 0.5 mm high in outline broadly campanulate, indented along the commissure, the rounded backed sides longitudinally ribbed; calyx lobes 5, narrowly triangular-subulate, green or tinged with rose, ca. 0.5 mm long, spreading, sometimes incurved-tipped, persisting on fruit; petals white, short-clawed, the blades somewhat fleshy, suborbicular, strongly incurved, apically short-acuminate, the mid-nerve raised above; stamens 5, the erect or incurvate, white, tapering filaments 0.5-0.7 mm long, the ellipsoidal-oblong bilocular anthers reddish, dorsifixed, introrse, ca. 0.3 mm long; ovary inferior, contained in perianth tube, crested by a bilobed, low-conic, yellowish stylopodium 0.2 mm high, the style branches slenderly linear, spreading, ca. 0.3-0.4 mm long, the stigmas capitate.

Fruit: schizocarp broadly elliptical in outline, 1.5-2.0 mm long, somewhat compressed laterally (broad plane of fruit perpendicular to commissural plane), thus fruit broadly oblong in cross-section; mericarps in cross-section semicircular, along the commissural border with an elevated, broad, spongy-thickened band, the rounded backs with 3 strong, green longitudinal ribs, the intervals broader, thin over the seed and with solitary oil tubes, dark-reddish-brown; commissural face of mericarp concave, except for the pale spongy border a dark reddish-brown, the oil tubes double.

Distribution and Flowering Season:

Wet savanna, shallow pineland pools, ditches and ditchbanks, very local, inner Coastal Plain and lower Piedmont, North Carolina south to southwest Georgia; flowering mostly in May and June, intermittently into July.

Special Identifying Features:

This species is very similar to the only other phyllodial-leaved Ptilimnium of our region, namely P. fluviatile, a species mostly confined to rocky shoals and bars of southern Appalachian and Piedmont streams. Transitional forms appear within what was once referred to P. viviparum (Rose) Mathias, and it might be most logical to consider all as varieties. The main differences appear to be that P. nodosum is a taller plant (P. fluviatile rarely reaches 6 dm) with the lower phyllodia longer. The number of umbels per compound, the number of pedicels per umbellet, is more, generally between 10 and 15 (usually 10 or less in P. fluviatile). The petals are slightly larger. The commissural edge of each mericarp is a corky-thickened ridge in P. nodosum, whilst in P. fluviatile this area is taken up by a strong but narrow rib.

Habitat and Management Implication:

The few existing localities known for P. nodosum appear to be shallow pineland ponds and low savanna meadows. The type locality of the species, a shallow pond near Ellaville, Schley Co., Georgia, no longer exists, and other habitat in the area of Unadilla in Dooly County Georgia appears also to have been destroyed. In Aiken County, South Carolina, two localities are still known, one an area of grassy savanna near Montmorenci nearly destroyed; the other, a shallow pond (doline) near Monetta, while disturbed, is still in good condition. The central habitat seems to be what is called by the local people "high pond". Such high ponds are shallow, ringed by willow oaks, Swamp Black Gum, Sweet Gum, Pond Cypress, and sometimes Pond Pine. The soil of the pond edges and bottom is typically a peat-muck, this overlying black fine sand or sandy-silty-clay, which in turn overlies solution rock. Such ponds have unpredictable shorelines, with water sometimes extending into the bordering forest, at others retreating to the center of the ponds or altogether disappearing. The dominant grass is Panicum hemitomon, with an interspersions of other Panicum, Leersia, Sacciolepis, and sedges such as Rhynchospora perplexa, R. microcarpa, R. tracyi, R. inundata, R. macrostachya, Carex walteri, C. lupulina, Eleocharis tricostata, E. melanocarpa, E. microcarpa, E. baldwinii, Psilocarya, Dichromena colorata, Fimbristylis, are encountered with Xyris jupicai, X. smalliana, X. fimbriata, Eriocaulon compressum; dicots often include Hypericum fasciculatum, H. denticulatum, H. myrtifolium, Rhexia virginica, R. mariana, R. aristosa, Proserpinaca pectinata, various Ludwigia such as L. spathulata, L. pilosa, L. sphaerocarpa, L. linearis, Centella, Hydrocotyle, Lindernia, Bacopa caroliniana, Justicia angusta, Lobelia, Sabatia, Polygonum. Composites may include Coreopsis nudata (in Georgia), C. rosea (in South Carolina), Rudbeckia mohrii, R. nitida (in Georgia). Sclerolepis is nearly always present and abundant.

Most of the few known localities have been destroyed. The main threat is either from use of the shallow ponds as stock tanks and as sources of irrigation water for adjacent fields, or from drainage preparatory to pine plantation. Another is from drainage followed by conversion to row crop agriculture.

References:

Radford, A.E., H.E. Ahles & C. Ritchie Bell. 1968. Manual of the vascular flora of the Carolinas, pp. 784-786.

Rose, J.N. 1905. Two new umbelliferous plants from the coastal plain of Georgia. Proc. Nat. Mus. 29: 441-442.

_____. 1911. Two new species of Harperella. Contribs. Nat. Herb. 13: 789-790.

Small, J.K. 1933. Manual of the southeastern flora, pp. 977-978.

SPECIES: Ptilimnium nodosum (Rose) Mathias

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X	X	X			X	X
Damage								
No Lasting Effect	X				X	X		
Beneficial if Done Properly								

Other Comments: Drainage destroys the habitat!

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Known Distribution of:

Ptilimnium nodosum (Rose) Mathias



ARISTOLOCHIACEAE

Hexastylis contracta Blomquist

Status: Threatened

Technical Description:

Perennial, evergreen, ginger-smelling Heartleaf, increasing by short, ascending, branching rhizomes, these with fascicles of fleshy, linear roots and with strongly raised leaf scars, the branches all floriferous, numerous enough on older plants to form densely leafy low domes of leaves.

Leaves: alternate, of 2 sorts; scale leaves thin, nearly round but sharply folded, venose, tan, viewed from side semicircular, falciform, to 1 cm long, the hinge straight or curved, the margins entire but often villose, enfolding the floral stalk base; foliage leaves of previous season persisting often beyond current season's flowers, new ones developing above scale leaves on fresh growth, erect or spreading on slender, elongate, clasping-based petioles 6-15 cm long, pale green or suffused with red pigments, the upper side grooved, all sides smooth or distally scabro-puberulent, the blades suborbicular to reniform or very broadly ovate, 4-7 cm long, leathery, apically narrowly rounded, broadly rounded, obtuseangled, rarely emarginate, the margins entire, narrowly inrolled, thus there thickened, the bases cordate-auriculate, the broadly rounded auricles overlapping or presenting an acute or oblong outline sinus, smooth, the upper surface lustrous deep green, impressed veiney, rarely paler along the main veins, the lower surface somewhat paler, slightly raised-veiney and quite pale along the main veins, sometimes also with suffusions of red pigment generally.

Flowers: solitary from axillae of scale leaves, but usually 2 or 3 per short rhizomal branch, thus often quite numerous on older plants and forming a compact clump of blooms, the slender, terete peduncles erect or ascending, 0.5-2.5 cm long, accrescent, usually hidden by scale leaves at early anthesis, much elongate by late anthesis or fruit, pale but often with much red or purple pigment distally; perianth comprised of sepals only, fleshy; sepals 3, mostly 1.5-2.5 cm long, united to form a flask-shaped tube, this narrowed at base, flaring at about the lower 1/3 to form a low, rounded flange, then narrowing slightly to the rim, here with the lobes broadly triangular, spreading, 5-7 mm long, the apex obtuse-angled, the sides rounded; external surface of perianth tube flesh-toned or pale green or pale lavender with dark, parallel nerves, these branching and anastomosing in the lobes; internal surface with lower 1/3 of tube raised-purple-reticulate, the ridges low, above this with upper tube smooth and ridgeless, the lobes sparsely villose-puberulent with some hairs having swollen purplish-pigmented bases, some patches of cells red-pigmented, forming a scrobiculate and patch pattern of red or maroon; stamens 12 in 2 close cycles, united and arising on short, fleshy filaments from near ovary apex, the erect anthers oblong, ca. 3 mm long, with a short apiculus; ovary 6-carpellate, inferior, producing apically a rim or ring of 6, erect, hornlike, fleshy styles and their extensions, these extensions narrowing to a blunt tip of 2 connivent lobes 1/2 as long as the extension, thence grooved externally down to the

roundish stigma "button".

Fruit: a berry like, subglobose capsule enclosed within the persistent calyx tube; seeds ca. 3/locule, wedge-shaped, compressed, brownish.

Distribution and Flowering Season:

Dryish to moist, acidic, shaded stream and river banks, ravine slopes, Cumberland Plateau of Tennessee (Kentucky?) and local in the Blue Ridge of western North Carolina; flowering in April and May.

Special Identifying Features:

H. contracta appears to be a borderline species between the large group "Virginica" (fide Blomquist, 1957) which have strong ridged-reticulations within the calyx tube base and pale areas along the veins of leaves which tend mostly to be roundish, and the "arifolia" group, which have leaves mostly triangular and a hypanthium which is flask-shaped, and which lacks ridged reticulation within toward base. The style extensions in H. contracta (the hornlike portion of style above the stigma button) is for the apical 1/2 bifid while all other reticulate-tubed species in the same complex have the extension entire or merely notched apically. While some other species have a rimlike flare on the calyx tube as does H. contracta, these others develop it medially or distally, while it is usually well below the middle in H. contracta.

Habitat and Management Implication:

H. contracta is locally abundant only in the Cumberlands of Tennessee, there being confined largely to steep, heavily forested streambluffs and ravine slopes that cut through sandstones of the Plateau. The soils are thus quite sandy, usually a fine sandy loam, highly acidic, often shallow or overlying sandstone detritus, usually moist but not wet. In the overstory are gymnosperms such as Canada Hemlock, White Pine, Shortleaf Pine, Virginia Pine, mixed with hardwoods such as Quercus rubra, Q. velutina, Q. alba, Q. coccinea, Carya cordiformis, C. tomentosa, Betula lenta, Tilia heterophylla, Acer saccharum, A. rubrum, Liriodendron, the more mesic species increasingly abundant toward bases of bluffs or ravines. The understory is predominantly ericaceous, the commonest being Rhododendron maximum, Kalmia latifolia, various Vaccinium, Oxydendrum, with the Rhododendron most abundant in the ravine bases, sometimes forming almost impenetrable thickets. Associated herbaceous species may include Polystichum, Athyrium, Dennstaedtia, Osmunda, Thelypteris (particularly T. noveboracensis), Adiantum pedatum, many carices, Erythronium, Polygonatum, Medeola, Trillium erectum, Stenandrium, Smilacina, Uvularia, Ranunculus, Hepatica americana, Anemone quinquefolia, Sanguinaria, Silene virginica, Stellaria pubera, Dentaria, Cimicifuga racemosa, Actaea, Viola blanda, V. hastata, V. conspersa, various Scutellaria, Zizia trifoliata, Thaspium, and several woodland composites, most notably Antennaria, Erigeron pulchellus

These interesting habitats have been much reduced by coal stripmining in recent years, which ruins both streams and surrounding slopes.

Another problem arises with the heavy cutting of the forests of ravines and streambluffs, with subsequent erosion, over insolation, and invasion by woody and herbaceous weed species. Sometimes this cutting is followed by mechanical site preparation which extends down even into some of the shallower ravines and branches. In any event, Hexastylis habitat is destroyed.

References:

Blomquist, H.L. 1957. A revision of Hexastylis of North America. *Brittonia* 8 (4): 255-281.

Radford, A.E., H.E. Ahles & C. Ritchie Bell. 1968. Manual of the vascular flora of the Carolinas, pp. 400-402.

SPECIES: Hexastylis contracta Blomquist

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X	X	X			X	
Damage	X				X	X		X
No Lasting Effect								
Beneficial if Done Properly								

Other Comments: Unless substantial belts of timber along streams and branches are kept, site preparation in the uplands results in much of the erosion moving into ravine bases and stream bottoms, burying vegetation

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Known Range of:

Hexastylis contracta Blomquist



ARISTOLOCHIACEAE

Hexastylis lewisii (Fernald) Blomquist & Oosting

Asarum lewisii Fernald

Status: Threatened

Technical Description:

Evergreen, ginger-smelling, perennial Heartleaf, increasing by both shallow, horizontal, pale, long-internoded, sterile rhizomes and short, bracteate, floriferous rhizomes, the primary roots tending to be thickish, with more delicate, fibrous branches.

Leaves: of 2 sorts, one scale-like, often overlapping, subtending petioles and pedicels on short offshoots, broadly ovate or suborbicular, ca. 1 cm long, strongly folded and broadly falciform when viewed from side, pilose-ciliate, the other developing on both sterile-elongate and short-floriferous shoots, erect on clasping based, teretish, fleshy petioles mostly 4-10 cm long, these grooved on upper side and there often sparsely pilose-puberulent, greenish with tints of red, and blades variable mostly 4-8 cm long, triangular to broadly oblong-ovate, ovate, suborbicular or reniform, apically broadly or narrowly rounded or retuse, the margin entire, narrowly revolute and thickened, scabro-ciliate toward base, the base auriculate, the upper surface a rich green, interrupted with broad paler zones along the palmate veins, producing a mottled effect, minutely scabro-puberulent along the veins, particularly toward the base, the lower surface usually smoother, often strongly tinged with red or purple.

Flowers: arising singly from axils of scale leaves on short-spreading or erect rhizomatous offshoots, bisexual, regular, the peduncle erect or nodding, terete, smooth, 1.0-1.5 cm long, lengthening in fruit, pale green tinged with purple; perianth 2-3 cm high, of sepals only; sepals 3, the calyx tube (hypanthium?) 1.5-2.0 cm long, broadly campanulate, flaring just above its middle to form a horizontal low ridge below the rim, the 3 lobes spreading, broadly triangular, 5-8 mm long, the surfaces externally smooth, pale green or flesh-toned mottled liberally with maroon and with parallel narrow purplish veins, internally with lobes and tube down to level of stamens deep maroon, bedecked with erect, long, bristly white hairs, the lower portion of the tube smooth, pale with parallel, strongly raised though narrowish, purple, papillose lines, these not with interconnecting ridges; stamens 12 in 2 series, erect, the fleshy filaments united for most their length to the short-cylindric erect ovary wall and forming a ring around it, the anthers linear with purplish valves and connective, ca. 3 mm long, basifixed, the connective produced beyond in a short apiculus, the carpels 6 united below in a superior ovary, the 6 erect, hornlike styles and stylar extensions forming a ring around the concave ovary apex, fleshy, linear, ca. 2 mm long, purplish, bearing medially on the outside a papillose stigma "button", the extension beyond apically notched; ovules with axile placentation, numerous.

Fruit: a subglobose, berry-like capsule ca. 1.5 cm long, contained within the persistent fleshy calyx; seeds wedge-shaped, compressed, carunculate, ca. 3-4 mm long, brown.

Distribution and Flowering Season:

Sandy loam or silty sandy loam of ravine slopes, and ravine bottoms,

inner Coastal Plain and outer Piedmont, southern Virginia south mostly along the Fall Line, into southeastern North Carolina; flowering mostly from March through April.

Special Identifying Features:

This Heartleaf is part of the largest group, the "Virginica" (fide Blomquist, 1957) of native Hexastylis, these all having style not cleft to the stigma button, leaves pale-mottled along veins, mostly cordiform, and calyx tube at least toward base strongly ridged-reticulate. E. lewisii stands out from these by being the only one of the complex to combine the character of long, leafy rhizomes (these often forming extensive patches several meters in area of scattered to approximate leaves) with calyx tube vertically strongly ridged but not reticulate inside. In addition, while some of this complex produce multicellular trichomes internally on the calyx, this species develops extra long, whitish hairs there which project stiffly inward or upward from the calyx lobes and around the orifice. No other species approaches it in these floral characters.

Habitat and Management Implications:

H. lewisii, like the other Heartleaf of the southeastern U.S., favors an acidic substratum that is high in sand, is usually a sandy loam, a sandy silty clay loam, or a sandy silt loam, and shaded. The overstory varies considerably in that this Hexastylis is found in everything from creek bottoms to tops of ridges. Thus it may be on low sandy rises under bottomland hardwoods, on cutbanks in same, in narrow ravines whose bottoms have mixed mesophytic forest prevalently the beech-maple facies, in low sandy woods heavy with canebrakes and Loblolly Pine, or dry to moist ravine slopes under pine-hardwood with heavy understory of heaths, particularly Kalmia, Vaccinium, or oak-pine crests with the forest floor carpeted with lowbush Vaccinium and Braken Fern. However, the best populations are in the lower ravine slopes and bottoms, usually ferny, and with many colorful spring forbs as associates.

Most who have seen H. lewisii in the field comment on the fact that it develops lots of leaves and length, but few or no flowers. My own observations are the same, but some light on this may be shed when one notes that the "heaviest" flowering is from plants with shoots creeping up rises around tree bases or on steep cutbanks, where the axis of the floriferous shoot is inclined. In that this plant is somewhat "viney" in character, it may be like some viney Aristolochia which may grow profusely over the ground but do not flower much except when climbing.

Threats to this species is many. First, it is endangered by conversion of the upland pine-hardwood to plantation pineland. Usually this involves a clearcut, followed by mechanical site preparation. While the rich bluffland along major streams is not effected usually, the smaller ravines and bottoms are, because of siltation resulting from such disturbance. Very often a small stream bottom may be buried under many inches or even feet. Heavy logging of bottoms

and ravine slopes is nearly as damaging. Hexastylis plants are shallowly rooted and may be washed away in the subsequent erosion. Such plants require loamy substrates and shade of the forest that contributes to the loam; they do not increase, in fact normally do not maintain, in full sun. In addition, heavy logging results in an increase of woody weeds in genera Lonicera, Rubus, Smilax, Pueraria, etc., which tend to choke out forest herbs. Selective or group-selective cutting would be a more suitable approach to such ravine and bottom habitat if the Hexastylis is to be kept.

References:

Blomquist, H.L. 1957. A revision of Hexastylis of North America. Brittonia 8 (4): 255-281.

Fernald, M.L. 1943. Asarum lewisii in Rhodora 45: 398-400.

Radford, A.E., H.E. Ahles & C. Ritchie Bell. 1968. Manual of the vascular flora of the Carolinas, pp. 400-402.

SPECIES: Hexastylis lewisii (Fernald) Blomquist and Oosting

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X	X	X		X		
Damage	X				X			X
No Lasting Effect								
Beneficial if Done Properly								

Other Comments: I have observed no plants in pine plantations.

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Distribution of:

Hexastylis lewisii (Fern.) Blomq. & Oosting



ASTERACEAE

Aster avitus Alexander

Status: Endangered

Technical Description:

Perennial, strongly clonalizing Aster, perennating by leafy lateral offshoots from a shallow, sometimes elongate and forking, rhizome, the rhizomes mostly 3-8 mm thick, terete, ribbed, often partly covered by fibrous remains of old petiole bases.

Stems: erect from a decumbent base, mostly 3-5 (-8) dm tall, usually 1 from each leafy offshoot of the previous season, rather slender but stiffish, terete, smooth proximally, puberulent from at least mid-stem into inflorescence, low-ribbed, pale green or with maroon tints in the inflorescence, the nodes numerous and usually leafy.

Leaves: Alternate. Rosette (offshoot) leaves and lower cauline leaves largest, 1.5-2.5 dm long, the blades 1/2 or more the total length, linear, elliptic-linear, linear-oblongate or linear-lanceolate, graminiform, rarely over 1.5 cm broad, acute and apiculate, marginally distantly spinulose-serrulate, the base attenuate to the clasping-based petiole, the surfaces smooth, a rich green, with only the midrib strong or sometimes obscurely triplinerved, the rest of the surface very finely areolate; cauline leaves grading smaller upward on stem, becoming narrower, shorter, more sessile, becoming lance-linear, scabrid-margined, inflorescence bracts.

Inflorescence: Heads rather few (3) to numerous (15 or more) in a simple cyme or a small compound of cymes, the branches densely puberulent, slender, arching-ascending in candelabra fashion, the secondary branches either terminating in 1-2-3 slender peduncles or rebranching from bract axils, in any event the peduncles usually longer than the heads are high; flowering heads broadly campanulate or turbinate, from base to pappus tip 1.2 - 1.5 cm high, the bracts strongly imbricated in several series, the lowermost grading into the short uppermost peduncular bracts, all green-tipped with firm (chartaceous) bases, the innermost longest, palest, thinnest, the median ones oblong, mostly 5-6 mm long, the green tips dilated, often somewhat squarrose, acute and apiculate, the margins ciliate, the surfaces otherwise smooth, the mid-and-lower part of the bract body straw-colored and very firm; receptacular surface nearly flat, chaffless.

Flowers: Ray florets usually not more than 15, often few, female but usually non-functional, the ligules pale to deep violet (rarely pinkish), spreading, above the tube 8-10 mm long, lance-linear; disc florets numerous, the corollas pale lavender, smooth, ca. 5 mm long, the slender tube dilating into a narrowly funneliform throat, the 5 spreading or ascending, triangular lobes ca. 1 mm long, the anther tube well exsert at anthesis, the 2 style branches with appendages linear-acuminate, externally minutely scabrid.

Fruit: Akenes ca. 5 mm long, columnar or slightly fusiform, sometimes slightly compressed parallel to phyllaries, mostly 10-12-ribbed, the ribs broader than the shallow intervals, the surface dull brown,

smooth or sparsely strigillose (these hairs not usually persisting), the pappus uniform, sordid, of numerous, capillary, antrorsely barbellate, bristles 1.0-1.5 mm long.

Distribution and Flowering Season:

Shallow sandy soils in or around granitic outcrops, Piedmont, South Carolina and Georgia; flowering from September to frost.

Special Identifying Features:

A. avitus is a perplexing taxon, perhaps not truly distinguishable on the one hand from extremes of A. surculosus (which has similar leaves and rootstocks, but usually more heads, a double pappus, hairier fruit) and on the other hand tending to the graminiform-leaved A. paludosus (which has a coarser pappus, often more heads/inflorescence and more rays florets). Consistent differences are simply not available, although extremes of A. avitus stand out very nicely from average conditions for either of the others. The entire complex requires taxonomic clarification.

Habitat and Management Implication:

The type locality for A. avitus is Stone Mountain, but that population has been destroyed. My comments are confined therefore to what I have found in the few remaining known localities. This aster is locally abundant in granite glades, is usually rooted in shallow soils of moister depressions in the granitic openings or along the edges of such glades in light shade. The substrate is a highly humified, acidic sand, the humus often high in peat from sphagnum or other mosses. Associated species in the Georgia areas are typical of what one normally finds around the shallow pools, streams or seeps that dot or traverse the rock, some of the more common being Andropogon, Sporobolus, Aristida, Panicum, Cyperus, Scirpus cyperinus, Rhynchospora (mostly R. capitellata, R. globularis), Commelina erecta, Crotonopsis, Senecio tomentosus (rosettes), Hypericum gentianoides, Oenothera fruticosa subglobosa, Rhexia mariana, Agalinis tenuifolia, Liatris microcephala, Solidago erecta, S. nemoralis, Viguieria. The aster is where the substrate is usually moistened by seepwater and remains moist through much of the growing season, as is evident from its frequent association with various Sphagnum. Overstory edging or over the aster is a yellow pine-oak-hickory type, the commonest pines being Virginia, Shortleaf, and Loblolly, the hickories mostly Pignut, Red, White and Sand, the oaks mainly Black, White, Post, Scarlet, Chestnut, Blackjack, and Red. The understory is dominated by Vaccinium arborescens, Rhus, Cornus florida, Cercis, Amelanchier, Sassafras, Chionanthus, with an abundance beneath these of lowbush blueberry, Smilax spp., Poison Oak and Poison Ivy. Japanese Honeysuckle is a common invader, and Bracken Fern is common.

This aster is losing habitat because of granite quarrying, various detrimental development either for recreational-promotional (which is what destroyed the Stone Mountain locality) or residential (which is destroying the one remaining publicized locality in Georgia!). Logging of the woodlands surrounding or on the granites, if unaccomp-

anied by excessive disturbance of the shallow soils, might actually tend to increase this aster, as would fire management, in that fire has been the historical factor in reducing woody plant competition.

References:

Cronquist, Arthur. 1980. Vascular flora of the southeastern United States, Vol. I. Asteraceae: pp. 137-162.

Small, J.K. 1933. Manual of the southeastern flora, pp. 1364-1394.

SPECIES: Aster avitus Alexander

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy								
Damage		NA	NA	NA			NA	X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Present Known Distribution of:
Aster avitus Alexander



ASTERACEAE

Eupatorium luciae-brauniae Fernald

Status: Endangered or Threatened?

Technical Description:

Perennial composite from a short, thick-cylindrical, or roundish, knobby caudex, the roots diffuse-fibrous.

Stems: Erect or ascending, 1-few from the caudex, mostly 5-10 dm high, stiffish but soft, slender (2-4 mm thick), smooth, or puberulent in the inflorescence, terete, sparingly low-ribbed and sometimes grooved, proximally usually purplish, pale green above base.

Leaves: opposite, all spreading or widely ascending-petiolate, the lowest smallest, the largest above mid-stem or toward stem apex, their petioles slightly shorter than to slightly longer than the blades, green with purplish tints, slightly angulate, the blades mostly 5-10 cm long, reniform to broadly ovate or suborbicular, or deltoid, apically rounded to short-acuminate, the margins coarsely serrate-dentate, the base broadly cordate to subtruncate, the texture very thin, the surfaces soft-puberulent with simple (rarely stellate) hairs, the upper much darker yellow-green.

Inflorescence: Heads few to many in small cymes, these either solitary and terminating the axis, or developed also from subtending nodes, overtopped by or overtopping the uppermost large foliage leaves, in the latter case then with abruptly much smaller bracteal leaves, these lance-ovate, narrowly ovate, or elliptic and grading into even shorter, linear bracteoles in the ultimate inflorescence, the primary and secondary peduncles slender, erect or arching-ascending, smooth or puberulent.

Heads: campanulate, from base to tip of florets 5-7 mm high, the involucral bracts erectish, several, the longest mostly in 1 inner series, ca. 3.5 mm high, but uneven, the shorter few outermost, mostly lance-linear, narrowly triangular, or oblong-linear, mostly narrowly acute, very thin, only the mid-nerve at all prominent, pale green with tints of purple, the backs puberulent; surface of receptacle low-convex, chaffless.

Flowers: All tubular, thus regular, bisexual, 12-20/head, the corollas white, ca. 3 mm long, the slender tube ca. 1 mm long, the narrowly campanulate throat ca. 1.5 mm long, the 5, spreading-ascending, triangular teeth ca. 0.5 mm long, the surface smooth, the exerted slender style branches white, papillose.

Fruit: Akenes in outline elliptic-linear or rarely columnar, sharply angulate-ribbed, 1.5-2.0 mm long, sparsely hispidulous along the ribs; pappus of many, white, antrorsely barbellate bristles, this up to 2.5 mm long, or in the case of outermost flowers sometimes reduced to a low crown of narrow squamellae ca. 0.3-0.4 mm long.

Distribution and Flowering Season:

Shaded sandstones, ledges, rockhouses, Cumberland Plateau, Kentucky southward into northern middle Tennessee; flowering from August to frost.

Special Identifying Features:

This Snakeroot is nearest E. rugosum Houtt. (Ageratina altissima (L.) King & Robinson, but differs from that variable taxon in its lower, weaker, softer, thinner stem and leaf habit, in its smaller petiole length-leaf blade length ratio, its somewhat smaller heads, the akenes of which are hairy (rather than smooth) along the ribs.

Habitat and Management Implication:

This plant, as briefly noted above, is confined to shaded sandstone ledges and overhangs in what are called "rockhouses". The sandstones, depending on the formation, weather either to a nearly pure sand or a sand mixed with gravel. The best sites are where shade is provided by the cliffs and ledges plus ravine slope and bottom trees, and much of the moisture is from dripping from the rock plus mist from falling or splashing water. Sometimes the ledges or overhang bases extend for considerable distances into a cliff or ravine slope, are actually roofs of caves of various size and depth. The floors of such are often dry as well as deeply shaded and support no vegetation; however, where water seeps, drips, or otherwise accumulates at the mouths of such caves there is usually a dense line of vegetation and E. luciae-brauniae abounds. Some of its common associates are *Carex* (several species), *Glyceria*, *Panicum*, *Agrostis*, *Stenandrium*, *Pilea*, *Boehmeria*, *Silene rotundifolia*, *Thalictrum clavatum*, *Houstonia*. Ferns in genera *Adiantum*, *Dennstaedtia*, *Asplenium*, *Dryopteris*, *Athyrium*, *Osmunda* are abundant, in some places dominant. The overstory is mixed mesophytic in character, with gymnosperms such as White Pine and Canada Hemlock in frequent groves admixed, the hardwoods commonly Red Oak, White Oak, Elm, Yellow Poplar, Sugar Maple, Red Maple, White Ash, Basswood, the understory with an abundance of *Rhododendron maximum*, *Kalmia latifolia*, highbush *Vaccinium*, *Clethra acuminata*, *Alnus serrulata*, and *Cornus*.

Threats to this habitat arise from heavy logging of the steep ravine slopes which promotes erosion of the slopes, choking of the streams and ravine bases, thus burying the bases of the plants during floods. Also, such logging admits too much light, this in turn resulting in drying of the habitat as well as "burning" the foliage of such sciophytes.

References:

- Clewell, A.F. & J.W. Wooten. 1971. A revision of Ageratina (Compositae: Eupatorieae) from eastern North America. *Brittonia* 23: 123-143.
- Fernald, M.L. 1950. Gray's manual of botany, ed. 8, pp. 1361-1370.
- King, R.M. & Robinson, H. 1970. Studies in the Eupatorieae (Compositae) Xix. New combinations in Ageratina. *Phytologia* 19: 208-229.
- Wofford, B.E. 1976. The taxonomic status of Ageratina luciae-brauniae (Fern.) King & Robinson.

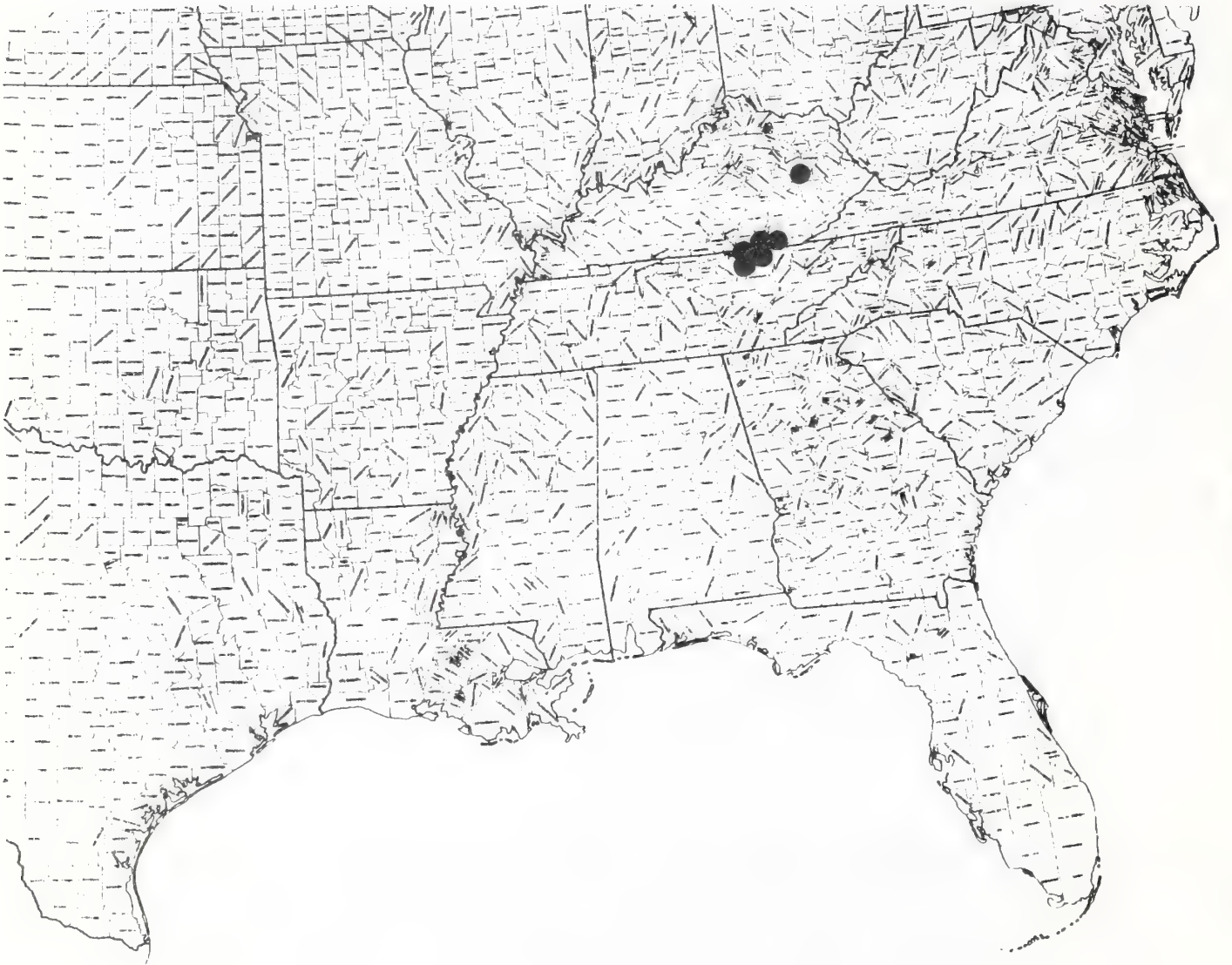
SPECIES: Eupatorium luciae-brauniae Fernald

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy	X				X	X		
Damage		NA	NA	NA			NA	
No Lasting Effect								
Beneficial if Done Properly								

Other Comments: the closely related E. rugosum, White Snakeroot, has metabolites that cause Milk Fever disease.

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Eupatorium luciae-brauniae Fern.



ASTERACEAE

Eupatorium saltuense Fernald

Status: Endangered?

Technical Description:

Erect perennial, mostly 1.0-1.5 meters tall, the short-decumbent base arising from a short, fleshy, teretish rhizome, the plants increasing by offshoots from the rhizomal crown.

Stems: 1-few in a tuft, terete and low-ribbed, toward base ca. 0.5 cm thick, with internodes short, numerous, brownish, smooth, upstem more elongate, purplish or reddish-brown, increasingly crisped-puberulent, the branches densely so, branching none or sparse below the inflorescence, the axillary shoots of main stem usually suppressed.

Leaves: opposite, the lowermost usually withering by anthesis, those at mid-stem usually largest, thence gradually reduced upward to the inflorescence and therein abruptly smaller; larger blades sessile or nearly so, somewhat folded, elliptic-linear or (mostly) lanceolate, spreading or slightly ascending, 5-10 cm long, firm, abruptly acute, the margin regularly and sharply low-serrate, scabridulous, the base cuneate, the upper surface yellow-green, usually smooth, covered with lustrous atoms of resin, indistinctly impressed-triplinerved, the lower surface slightly paler, smooth and resin-dotted save for the raised, puberulent triple-nerves and less distinct other lateral veins.

Inflorescence: basically cymose, a compound of stiffly ascending primary branches, these with spreading, lance-linear, puberulous bracts and toward apex rebranching, the secondary branches terminating in small, tightish cymules of heads, the total inflorescence then nearly as wide as long or wider, shallowly dome-shaped or flat or somewhat concave; heads mostly 5-7 mm high (from base to tip of pappus) cylindrical, the receptacle flattish, narrow, the erect bracts in ca. 3 series, erect and loosely imbricated, the outermost ones much shorter, triangular, the mid-and-inner ones mostly 4-5 mm long, oblong, apically narrowly rounded or acute (rarely acuminate), the backs puberulent, greenish and resin-gland-dotted, rounded or slightly folded along the single evident nerve, the margins toward apex broad, white, scarious, villosulous-ciliate, toward base forming a narrow white border.

Flowers: ca. 6, all discoid, all fertile, the corollas tubular, white, ca. 4 mm long, the 5 spreading lobes triangular, externally dotted with resin glands, the 2 linear style branches spreading, glistening papillate, spreading.

Fruit: akene dark brown, columnar, acutely and sharply rib-angled, glistening gland-dotted; pappus of numerous, white, antrorsely barbellate capillary bristles ca. 6 mm long.

Distribution and Flowering Season:

Sandy clay of brushy disturbed clearings, roadsides, edges of fields, Coastal Plain, southeastern Virginia (Dinwiddie, Surrey, Sussex Counties); flowering from August through September.

Special Identifying Features:

The status of this taxon is yet argued, muddled in a maze of apomicts involving E. album, E. leucolepis, E. hyssopifolium. The most current work done on it was by Dr. Victoria Sullivan (unpublished Ph.D. Thesis, 1972) with Dr. R.K. Godfrey. They have collected from several populations and suggest that the plants are, in regard to suppressed axillary shoots, general aspect, pubescence and flowering heads, very similar to varieties of E. hyssopifolium, but are broader leaved (lanceolate rather than linear!). They opine that the broader leaf may have arisen by way of E. album L., or less possibly by genetic influence of E. altissimum L., both of which occur in the same area. I found what appears to be E. saltuense along a road in a highly disturbed, brushy ecotone between Loblolly Pine-oak flats and a somewhat higher area dominated by oak and hickory with plenty of E. album in the openings. In the same place E. hyssopifolium was abundant in clearings in both the higher and lower woods, as well as along the road. The E. saltuense was occasional, mixed with far more individuals of both E. album and E. hyssopifolium and I was able to make some comparisons in the field. E. album, a stockier, firmer and broader-leaved plant with coarser stem and leaf pubescence, showed much longer, narrower, paler phyllary tips while the E. hyssopifolium on the other hand tended to be taller, to have shorter hairs on stem and leaves, with blades mostly lineal, spatulate-linear, or elliptic-linear, with lower and fewer teeth. Thus the E. saltuense individuals give every appearance of being intermediate. Herbarium specimens show this same intermediacy.

Habitat and Management Implication:

E. saltuense, suspected to be of recent hybrid origin probably between E. album and E. hyssopifolium var. calcaratum (Sullivan, l.c.), is to be looked for in disturbed sites where both putative parental species may grow. E. album, a common upland Thoroughwort of the area, prefers dryish sands, sandy loams or sandy clays in open stands of oak-pine or brushy upland woodland clearings and pastures created in this type. E. hyssopifolium is by far more abundant, growing in nearly any open woodlands or natural or artificial clearings nearly throughout, so long as they are not boggy or swampy. The two come together in sites such as "brushy pastures", which is what the epithet "saltuense" means. The mystery of this plant is that it is triploid, obviating a complex origin from diploid parents, in that while E. album is diploid, material of E. hyssopifolium so far studied from that area is triploid also. Another unanswered question is why, if such an event has occurred in southeastern Virginia, and if E. album and E. hyssopifolium are found in mixed populations over a many state area, are there not more examples of this hybrid (even if a small-chance hybrid)? Material identified as E. saltuense from three counties in eastern North Carolina appear more likely to be E. mohrii or E. anomalum, both putatively of hybrid origin involving other parents. One may conclude about E. saltuense only (1.) that it is suspected of hybrid origin (2.) that it occurs so far only in recently disturbed sites in which the two suspected parental types occur. Clearing of forest in areas where upland and lowland forest or field come together has, then, created the sort of intermediate habitat in which this particular plant can develop. The plants

have to maintain apomictically. Preservation depends on locating known populations and maintaining disturbance so as to prevent succession to original forest types.

References:

Fernald, M.L. 1942. Additions to the flora of Virginia. *Rhodora* 44: 461.

Johnson, M.F. 1974. Eupatorieae (Asteraceae) in Virginia: Eupatorium L. *Castanea* 39: 205-228.

Sullivan, Victoria I. 1972. Investigations of the breeding systems, formation of auto- and allopolyploids and the reticulate pattern of hybridization in North American Eupatorium (Compositae). Unpublished Ph.D. Thesis, Florida State University.

Eupatorium saltuense Fernald



ASTERACEAE

Helianthus glaucophyllus D.M.Smith

Status: Threatened

Technical Description:

Perennial, smoothish sunflower mostly (1-) 1.5-2.5 meters high, from a rather elongate, fleshy, slender rhizome and diffuse-fibrous, thickish roots.

Stems: erect, solitary or few, slender but firm, toward base mostly 5-8 mm thick, glabrous, terete, the internodes short toward base, much elongated upward on stem, there pale green, glaucous, finely longitudinally ribbed, branched usually only in the inflorescence.

Leaves: opposite throughout, those of the lower stem withered by flowering time, the larger ones at about mid-stem, spreading or ascending, the petioles slender, glaucous, ciliate-based, mostly 2-3 (-5) cm long, the blades mostly lance-triangular or narrowly ovate, 10-18 cm long, to 7 cm wide, thinnish, the apex narrowly acute, the margin irregularly coarsely serrate save at base, where entire, the base narrowly to widely cuneate, the upper surface a rich deep yellow green, smooth, the lower surface much paler, even glaucous, smooth, glandless (not dotted with small resinous glands), the midrib and primary laterals raised and pale, the rest of the surface a fine reticulate of green veins. Leaf blades gradually reduced upward on stem and into inflorescence branches.

Inflorescence: heads few, smallish, on slender scabrid peduncles in cymes at tips of short, terete, slender-and-spreading primary branches from the axils of upper stem leaves, the bracts small, mostly lanceolate, entire, short-petiolate. Involucre campanulate, ca. 7 mm high (from base to tip of longer bracts), the phyllaries erectish or with tips only spreading, loosely imbricated in about 3 series, the outer ones narrowly triangular-linear, greenish, narrowly acute, scabro-ciliate, the bases firm, raised-parallel-nerved, the inner series thinner, somewhat shorter, oblong-triangular, acute, scabro-ciliate, green apically, greenish-brown and raised-nerved at the chartaceous bases; surface of receptacle convex, the chaff (pales) oblong, apically trifid with 3 narrowly acute teeth, the central one longest, ca. 5-6 mm long, pale brown, ciliate, the rounded backs strongly ribbed, hirtellous or strigillose.

Flowers: both ray and disc present, the ray florets female but non-functional, about 5, the corolla with short (ca. 1 mm) tube and spreading, elliptic-oblong, yellow ligules ca. 1.2-1.5 cm long; disc florets tubular, ca. 5 mm long, deeper yellow, the base constricted with a short, flanged or cup-like basal rim, above the constriction more broadly tubular into the throat, there with 5, erectish triangular lobes, externally smooth.

Fruit: akene oblong, slightly angulate, ca. 3.5-4.0 mm long, its apex broadly rounded or subtruncate, the surface smooth, lustrous, dark gray-brown; pappus rather early deciduous, of 4 unequal, subulate ciliate awns to 2 mm long.

Distribution and Flowering Season:

Cool moist upland woods, Blue Ridge, western North Carolina and eastern Tennessee at elevations mostly over 2500 feet; flowering from July into early September.

Special Identifying Features:

The smoothish, glaucous stems, tall, slender habit, strongly petiolate, mostly lanceolate leaves, and the small heads show that this species is closely related to H. microcephalus, a common and widespread, ecologically ample species throughout most of the southeastern U.S.A. The main difference is that the lower surfaces of the leaves of H. glaucophyllus are smooth and lack the resinous atoms that copiously dot the usually puberulent lower leaf surfaces of H. microcephalus.

Habitat and Management Implication:

H. glaucophyllus is found at elevations usually above 2500 feet in the Blue Ridge mountains, usually in the shade of hardwoods or at their edges, and generally on steep slopes. The substratum is normally a sandy loam or a sandy clay loam, this often accumulating amongst granite boulders, and is moist and cool. The overstory is mainly hardwoods such as White Walnut, Bitternut Hickory, Red Oak, White Oak, Tulip, Cucumber Magnolia, Sugar Maple, Red Maple, Yellow Buckeye, White Ash, Basswood, with an understory of Cornus, Sassafras, Viburnum, Halesia, etc. Ferns such as Adiantum, Dryopteris, Thelypteris, Dennstaedtia, Athyrium are numerous. Grasses such as Bromus purgans, Agrostis, Cinna, Panicum, Brachyletrum, Elymus etc. and sedges in Scirpus, Carex, are frequent together with a rich representation of mesophytic forest herbs such as Disporum, Trillium, Polygonatum, Uvularia, Hepatica, Actaea, Cimicifuga, Ranunculus, Sanguinaria, Viola, Sanicula, Angelica, Ligustrum, Impatiens, Physostegia, Scutellaria, Campanula americana, Eupatorium (particularly E. rugosum, E. maculatum), Heliopsis, Coreopsis, Rudbeckia (particularly R. laciniata), Aster, Solidago. In the southern Blue Ridge of North Carolina this sunflower may be associated with the equally rare Coreopsis latifolia.

It may be concluded from the list of associated herbs above that this is a sunflower of moist, humic soils and full to light shade. The threat to it is therefore clearcutting of the often valuable hardwoods that provide shade and coolness, particularly if this disturbs the soil. There is resultant erosion of exposed soil together with an invasion or increase of woody weeds such as Rubus, Smilax, Lonicera, Parthenocissus, etc. On the other hand, selective or group-selective cutting would reduce such impact significantly and allow this sunflower to maintain.

References:

Heiser, C.B. 1966. The North American sunflowers (Helianthus).
Mem. Torr. Bot. Club 22 (3): 1-218.

Smith, D.M. 1958. Helianthus glaucophyllus D.M. Smith, in Brittonia
10: 142.

SPECIES: Helianthus glaucophyllus D.M. Smith

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		NA	NA	NA		X	NA	
Damage	X				X			X
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Range of:

Helianthus glaucophyllus D.M. Smith



ASTERACEAE

Polymnia laevigata Beadle

Status: Threatened?

Technical Description:

Pungently aromatic, annual or perennial, bolting from overwintering rosettes, the roots shallow, tap or branched tap, fleshy, strongly tapering, with fibrous laterals.

Stems: one or few from the rootstock, from 1.0-2.5 meters tall depending on moisture and richness of substrate, slender (mostly 0.5-1.5 cm thick at base), stiffly erect from a short-decumbent base, fistulose, toward base and at nodes and young tips frequently purplish, otherwise pale green, by anthesis smooth, terete, multi-low-ribbed, the nodes toward base crowded and swollen, upward with internodes longer, branching usually only in the upper half, the branches slender, divaricate, opposite, the plant crown therefore broad. Leaves: opposite, spreading or ascending, the lowest and those of rosettes withering by flowering time (save for those of rosettes that do not bolt!), the largest leaves either at very base in spring or in the upper part of the stem subtending branches, these 15-25 (-30) cm long, the slender petiole $1/4$ - $1/2$ the total length, aging smooth or with some villous hairs along the grooved upper side, the blades mostly elliptic, deeply incised-pinnatifid, the lowest lobes very short and distant, the larger lobes, including the terminal, oblong or triangular, their tips narrowly acute or acuminate, their margins saliently triangularly relobed or toothed, the sinuses rounded, sometimes nearly closed, the upper surface a rich dark green, smooth save for the puberulent major pinnate veins and midrib, the lower surface paler, similarly smooth, even to the raised pale veins. Blades of upper stem and branches increasingly distant, more sessile, less lobed, the uppermost ones often triangular-hastate, those of ultimate branchlets becoming lance-linear or elliptic-linear, less than 2 cm long.

Inflorescence: heads small, mostly 5-6 mm high, in small cymes, these short-stalked, diffusely arranged on slender, villosulous primary peduncles, or even solitary; involucre very broadly campanulate or cup-shaped, rather loose, the outer phyllaries cupped, foliaceous, green, in few series, the outermost ones narrowly triangular or oblong-lanceolate, to 5 mm long, obtuseangled or rounded, ciliolate, the backs smooth or sparsely appressed-puberulent, the inner broader, somewhat shorter or longer, mostly broadly ovate to suborbicular, strongly cupped, apically broadly rounded, marginally ciliate, the backs appressed-puberulent, these grading inward to broadly oblong or oblanceolate, thinner and greenish-tipped chaff on the somewhat elevated receptacle.

Flowers: ray florets 5 or fewer, fertile, strictly female, the corollas white, dotted with short, glandular hairs, the tube villosulous, the ligule spreading, apically toothed, mostly broadly obovate, ca. 3 mm long, the 2 style branches slender, spreading-recurved; disc florets strictly male, ca. 15, the corollas with narrowly tubular base to 2.5 mm long, the throat short, broadly campanulate, the lobes erect or slightly spreading, triangular, the surface smooth, greenish-yellow or yellowish-white.

Fruit: akene obovate, ca. 3 mm long, short-stalked, subangulate, longitudinally with ca. 5 low ribs, the broadly rounded or subtruncate and indented apex with the pappus forming a short, narrow crown, the fruit surface dark brown, minutely appressed-puberulous.

Distribution and Flowering Season:

Rich wooded slopes, shaded limerock outcrop areas, scattered localities in Cumberland Plateau, Coastal Plain, and Interior Highlands, Kentucky, Missouri, Arkansas, Tennessee, northern Alabama and Georgia, northern Florida. Flowering from July (June in Florida) to frost.

Special Identifying Features:

P. laevigata is vegetatively rather similar to P. canadensis, and may be actually in mixed populations with it as well as with the showy-liguled P. uvedalia L. which it resembles not at all. It is distinguished from the former by its smoother, more deeply dissected leaves and narrower leaf segments, its smaller heads, and its akenes which are 4-5-angled rather than 3-angled.

Habitat and Management Implication:

P. laevigata is probably more abundant in the Cumberland Plateau of southern Tennessee than anywhere else in its known range. Usually the plants are in rocky woods, in light to dense shade of mixed mesophytic woods, on moist loamy substrates which may comprise deep soil pockets around or shallow deposits over ledges and large rocks. While early descriptions of habitat indicate that the plant favors somewhat acid soil, this is not always the case. Usually the plants are most abundant over limestone, although this may have over it a detritus of large and small sandstone boulders from upslope, and the soil it is rooted in is often high in clay or is a clay loam. In Jackson County Florida, where it abounds locally in Marianna Caverns State Park, the plants are particularly common on thin moist soil mantles directly over limerock.

As stated above, the best plants appear in shade of mixed mesophytic forest and on moist loamy and rocky substrates. The overstory has in it White Oak, Red Oak (in localities north of Florida), Shumard Oak, Yellow Oak, Beech, Bitternut Hickory, Elm, Black Locust, White Ash, Sugar Maple, Basswood, Tuliptree, various Magnolia, etc. Herbaceous associates are the typical herbs of rich woods, with abundant ferns, woodland grasses in Chasmanthium, Festuca, Bromus, Brachyletrum, Poa, Elymus, abundant carices, Muhlenbergia, Polygonatum, Uvularia, Trillium, Smilacina, Hepatica, Actaea, Delphinium, Aquilegia, Sanguinaria, Urtica, Laportea, Tovara, Sanicula, Thaspium, Zizia, Lysimachia, Phlox, Scutellaria, Campanula americana, Impatiens, and an abundance of composites in Aster, Eupatorium (particularly rugosum), Solidago, Helianthus, etc.

Such sites produce valuable hardwoods and most have been logged at least once; only the steepness of much of the terrain and the

rockiness of the soil have prevented even more severe impact. In places where I have seen the effect of logging, it is most adverse where an area has been clearcut, in that erosion is severe, washing away the soil in which the Polymnia roots. The increased light dries out the soil. Also, such operations are usually followed by a massive invasion of undesirable and rank weeds, vines and shrubs (i.e. Lonicera, Pueraria, Rubus, Smilax, Rhus, etc.) which tend to put a lot of pressure on other less aggressive species.

References:

- Beadle, C.D. 1898. Polymnia laevigata Beadle in Bot. Gaz. 25: 278.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1406-1407.
- Wells, J.R. 1965. A taxonomic study of Polymnia (Compositae).
Brittonia 17 (2): 144-159.

SPECIES: Polymnia laevigata Beadle

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		NA	NA	NA		X	NA	
Damage	X				X			X
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Distribution of:

Polymnia laevigata Beadle



ASTERACEAE

Solidago pulchra Small

Status: Endangered

Technical Description:

Rather delicate, smooth, wand-like goldenrod perennating by short lateral rosulate offshoots from a short, erect caudex.

Stems: usually one/rosette, erect, slender (toward base ca. 2 mm thick), 3-10 dm high, terete, strongly rounded-ribbed, strongly tinged with red or purple, the nodes numerous.

Leaves: alternate, plants leafy throughout, the largest stem leaves lowermost, the rosette strong and its leaves largest of all, spreading, 4-8 cm long, the petioles 1/2 or slightly more of the total length, the blades narrowly elliptic to oblanceolate, firm, acute, the entire margin somewhat thickened, reddish, the base attenuated, the surface yellow-green, only the midrib evident; stem leaves at plant base somewhat smaller than rosette leaves but similar, then grading abruptly to numerous, erect, much smaller and sessile ones, these oblanceolate to narrowly elliptic-oblong or short-linear, and which by midstem are often 1 cm long or shorter and at inflorescence base rarely 3-4 mm long.

Inflorescence: Heads few (3-15), in a short, rather narrow, sometimes crook-tipped inflorescence, evenly disposed or unilateral, the peduncles erect or ascending, shortish (from shorter than heads to ca. 7 mm long), slender, angulately ribbed, sparingly to several-bracteolate. Flowering heads ca. 0.5 cm from base to tip of florets, broadly campanulate or turbinate, the phyllaries several, loosely imbricated in few series, thin, yellowish, the largest ca. 3 mm long, apically obtuseangled or narrowly rounded, marginally ciliolate, otherwise smooth, the midrib only evident, this a raised yellowish-resinous band; outermost phyllaries short-linear, sometimes keeled; receptacle flat, chaffless.

Flowers: Rays about 5, the ligules a bright, pale yellow, spreading obovate, 3.0-3.5 mm long, the flowers female, non-functional; disc florets 20-25, the corollas ca. 5 mm long, a deeper yellow, the short tube dilating, narrowly funnelform into the throat, the limb spreading or ascending, of 5, triangular lobes ca. 1 mm long, the style branches lanceolate, acute, externally papillose.

Fruit: Akene columnar, faintly longitudinally ribbed, ca. 1.5 mm long, pale brown, hirtellous, the pappus of white, rigid, capillary bristles reaching about the level of the disc corolla limb.

Distribution and Flowering Season:

Moist sandy peat of flatwoods savanna and pocosin borders, Coastal Plain, two counties in eastern North Carolina; flowering from September to frost.

Special Identifying Features:

My own experience with this seemingly rare plant has been but one sighting, this in Onslow County, N.C. in fall of 1964. My

reaction then was to identify the plants as rather depauperate S. stricta Ait., with which this species is unquestionably allied. The differences appear to be few, namely that S. pulchra is consistently smaller, lower, more slender than most S. stricta. It produces a short caudex below its rosette as does S. stricta, but has no slender rhizomes as does S. stricta. The heads/inflorescence are few compared to S. stricta, (3-15 versus 20 or more). Dr. R.K. Godfrey, a long time and field-experienced student of Asteraceae, tells me (pers. comm. 1980) that this kind of morphology shows up through the habitat and range of S. stricta in northern Florida. Such forms should be investigated to clarify the real geographical and taxonomic limits of S. pulchra.

Habitat and Management Implication:

S. pulchra, as presently understood, is found in moist savanna in eastern North Carolina. My own collection appears to have been the most recent one made, and the habitat information therefore is confined to what was true for that locality. This one area was grass-sedge dominated savanna. The overstory was a dotting of Pinus serotina and P. palustris with some Nyssa biflora and Taxodium ascendens in the lower spots. The shrub growth around the grass-sedge openings was made up mostly of heaths in genera Vaccinium, Zenobia, Leucothoe, Lyonia, Rhododendron, Gaylussacia, Kalmia angustifolia, with Clethra, Ilex glabra, I. coriacea, Myrica, Aronia, Arundinaria, interspersed with taller but shrubby growths of Cyrilla, Gordonia, Magnolia virginiana, Rhus vernix and Persea. The soil in such places is a moist, (seasonally quite wet) black sandy peat, the openings where this goldenrod was were fire-created. Among herbaceous associates were Rhynchospora (many species, including R. pallida), Dichromena latifolia, Fimbristylis puberula, F. autumnalis, Psilocarya, Scleria, Eleocharis, Xyris, Eriocaulon, Lachnocaulon, Juncus, Pleea tenuifolia, Lycopodium, Osmunda, Sarracenia, Dionaea, Drosera, Polygala lutea, P. cymosa, Rhexia, Ludwigia, various composites including Liatris spicata, Carphephorus, Bigelowia, Marshallia graminifolia, Helianthus, etc. Common Solidago in the area were S. fistulosa, S. rugosa, S. stricta.

Much of this savanna-bog habitat has now been converted to plantation pineland or to row crop agriculture. Both involve ditch drainage and radical soil disturbance. In the case of mechanical site preparation, plants such as the Solidago may persist for a time in the drier habitat but disappear as the pine establishes.

References:

- Cronquist, Arthur. 1980. Vascular flora of the southeastern United States, Vol. I. Asteraceae: pp. 116-133.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1344-1360

SPECIES: Solidago pulchra Small

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X		X			X	
Damage No Lasting Effect			X					X
Beneficial if Done Properly	X				X	X		

Other Comments: Drainage destroys the habitat!

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Solidago pulchra Small



ASTERACEAE

Solidago verna M.A. Curtis ex T. & G.

Status: Threatened

Technical Description:

Perennial goldenrod from a stout (to 1 cm thick), knotty ascending rhizome or caudex, perennating by short lateral offshoots from crown buds.

Stems: Erect or ascending, bolting from rosettes of the previous year, mostly 0.5-1.5 m high, solitary or in small clumps, stiffish and straight to somewhat flexuous, to 5 mm thick at base, terete with several low, rounded ribs, villosulous (with short, kinky hairs) with pale pubescence throughout, greenish with tints of purple, the upper 1/3 usually liberally branched, the lowest branches longest, arching upward, then outward.

Leaves: alternate, also in rosettes. Rosette leaves largest, usually more than 1/2 petiole, 1-3 dm long, the blades suborbicular to broadly elliptic, obovate or ovate, acute to rounded, the margin crenate-serrate to crenate-dentate, the base abruptly attenuate and decurrent to form a petiolar wing, the upper surface a bright yellow-green, strigillose-puberulent, the lower surface paler, villose-tomentulose, particularly along the raised main veins, the pattern pinnate-arcuate, the petioles slender but winged, stiffly spreading, erect or ascending, marked with maroon along the main ribs. Stem leaves at base similar to rosette leaves, toward mid and upper stem gradually smaller, elliptic to ovate or lanceolate, erectish, grading to short, oblong, elliptic or linear inflorescence bracts.

Inflorescence: Inflorescence branches with a scattering of small bracts, usually producing abundant heads or small cymules of heads densely in the upper 1/2, these unilateral (secund) on the upper side of the branch, the total inflorescence usually spreading to become broad as long or broader than long (rarely inflorescence with laterals more ascending or shorter, thus narrower); peduncles slender but stiffish, tomentulose, from slightly shorter than heads to 1.5 times longer; heads broadly campanulate, from base to tip of pappus ca. 5-7 mm high, the receptacle flattish, chaffless, the involucral bracts (phyllaries) many in several series, the outermost, (lowest) greenest, shortest, lance-oblong, or lance-linear, acute, grading into the few peduncular bractlets, the median and inner phyllaries 3-5 mm long, loosely imbricated, narrowly oblong, flat, thinnish and at least above the middle green on either side of a yellowish, translucent midrib (sometimes also with an indistinct lateral nerve or two), apically rounded or acute, very thin and lacerate-ciliolate, the margins broad, thin, pale, ciliolate, the backs smooth.

Flowers: Ray florets mostly 8-10, the ligules spreading, a pale but rich yellow, elliptic, ca. 4 mm long, the appendaged style branches present but the flower non-functional; disc florets many, the corollas 4-5 mm long, the tube and throat forming a narrow funnell, the 5 erect to spreading, bright yellow lobes narrowly triangular, 1.0-1.3 mm long, the lance-linear style branches exerted, acute,

papillose externally.

Fruit: Akene columnar, obscurely ribbed, sometimes slightly compressed, 2.0-2.5 mm long, strigillose with pale hairs; pappus about the length of the disc florets, white, simple, of numerous antrorsely barbellate capillary bristles.

Distribution and Flowering Season:

Sandhill-pocosin ecotones, moist rises in wet flatwoods and savannas, Coastal Plain, scattered localities in the southern half of eastern North Carolina southward into northeastern South Carolina; flowering in May and June.

Special Identifying Features:

S. verna firstly is distinguished by its early flowering habit, being at anthesis when most other goldenrods have not yet bolted from their rosettes, thus it is seemingly well isolated reproductively. It is part of a rather large group of species that have leaves progressively smaller from base to tip of shoot, with the lower ones persisting, and which in addition have heads arranged unilaterally along spreading, outwardly arching inflorescence branches. Were it not such a hairy plant, and flowering in spring, it would be quite similar superficially to some of the S. arguta complex. Some other species (S. nemoralis, S. ulmifolia, S. brachyphylla) combine hairy foliage with hairy fruit, but S. verna has more disc flowers (14-30 versus 3-8) than these, therefore has larger heads.

Habitat and Management Implication:

S. verna frequents a rather wide range of habitat within its narrow range. In the inner coastal plain of the Carolinas it is most commonly found in the ecotone between high sandy Longleaf pineland and the shrub bogs (pocosins) that fringe the depressions in or border the streams and rivers that drain, the sandhills. It is a plant of full sun or light shade, with its commonest associates being part of a grass-sedge system, all rooted in a dark sandy peat loam which is usually moist, not wet. In the eastern Coastal Plain of North Carolina it is found occasionally in pine flatwoods savanna, usually again in transitional zones around Longleaf Pine-Turkey Oak rises in titi or pocosin, but not in the wettest bog. The shrubby formations no doubt were, in nature, the main competitive factor either in the sandhills or lower Coastal Plain, and these shrubs together with the pine-hardwood overstory were reduced by frequent naturally occurring woods fires sufficient to produce the openings this plant frequents.

S. verna is being reduced by a combination of factors, one being the rapid expansion of urban and residential construction in the Coastal Plain, another the rapid conversion of savanna and pocosin to plantation pineland, still another the utilization of the black sandy peats for row crop agriculture or improved pasture, all of these involving either total habitat destruction or drainage, which ultimately achieves the same effect. Best chances for survival of this species are probably to be found in the sandhills, which are less suitable for large scale slash pine plantings or for row crop agriculture.

References:

Cronquist, Arthur. 1980. Vascular flora of the southeastern United States, Vol. I. Asteraceae. Solidago, pp. 116-133. Chapel Hill.

Small, J.K. 1933. Manual of the southeastern flora, Solidago, pp. 1344-1360.

SPECIES: Solidago verna M.A. Curtis ex T. & G.

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X		X			X	
Damage			X					X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Known Range of:
Solidago verna M.A. Curtis ex T. & G.



CAMPANULACEAE

Lobelia gattingeri A.Gray

L. appendiculata A.DC. var. gattingeri (Gray)McVaugh

Status: Threatened

Technical Description:

Annual or biennial, bolting in late spring from an overwintering (rarely oversummering) rosette, the roots diffuse and slender.

Stems: single or few, or several, erect or ascending, simple, branching only from very lowest nodes or in the inflorescence, (1-) 2-5 (-7) dm high, terete and strongly ribbed, or multiangulate, the angles below the leaf margins low-winged, smooth, pale yellow green or suffused with purple distally.

Leaves: alternate, the largest in the rosette, (this sometimes withered by anthesis) sessile or nearly so, oblanceolate to oblong-ovate, obovate or broadly spathulate (1-) 2-6 cm long, smooth, pale green or tinged with purple, apically rounded, marginally entire, sinuate, distantly denticulate, serrate or basally variously toothed; cauline leaves numerous but rarely overlapping, progressively shorter up the stem.

Inflorescence: flowers many, spreading, spirally arranged, distant below, close above, in narrow, stiffish, indeterminate, bracteate racemes 1/2-3/4 the total plant height, the bracts grading into upper stem leaves below, progressively smaller upward in raceme, mostly narrowly lanceolate to lance-linear, mostly 0.5-1.0 cm long, entire or with a few narrow teeth or glandlike denticles basally, the pedicels erect, mostly 3-5 mm long, granular, minutely 2-bracted at base.

Flowers: very showy at anthesis, bisexual, irregular, 1.0-1.5 cm long; calyx smooth, ca. 4.0-4.5 mm long the tube campanulate, ca. 2 mm long, slightly dilated at base dorsally, 10-nerved, thin, pale green tinged with purple or violet, the 5, erect or slightly spreading lobes subequal ca. 2.5 mm long, subulate, entire, lacking auricles or auricles minute; corolla strongly bilabiate, the tube pale blue with deep blue lines, ca. 5 mm long, slightly dilated to an oblique orifice, and slit (fenestrate) above, the upper lip with 2, erect and spreading, narrowly triangular teeth, the lower lip longest, projecting forward and downward, trilobed with 3 subequal, oblong, obtuseangled, spreading, flat lobes, a deep bright blue and smooth save for a villosity on the lip base and lower side of corolla tube internally; stamens 5, erect, bent slightly at apex, ca. 5 mm long, the flattened filaments pale blue, the gray-blue anthers forming a cylinder, the connective edges and anther tips white-strigillose; ovary inferior, bicarpellate, the numerous ovules axile, the style linear, dilated and with a tuft of hairs apically at the level of the anther apex.

Fruit: a loculicidal, thin-walled, ovoid capsule, its apex barely exceeding the calyx tube and with 4, incomplete cells; seeds pale red-brown, ellipsoidal, slightly flattened, finely cancellate and irregularly rugulose.

Distribution and Flowering Season:

Seasonally moist limestone clearings and glades, middle Tennessee and (?) northern Alabama; flowering mostly from mid May through June, intermittently till frost.

Special Identifying Features:

This smallish flowered but showy plant is nearest L. appendiculata Lam., a taller, larger-leaved plant with a distinct range, primarily east Texas north to Oklahoma, Kansas, (?Illinois) and eastward into the Coastal Plain of Alabama. L. gattingeri has entire or rarely distantly glandular-denticulate, mostly exauriculate (rather than glandular-ciliate and auriculate) calyx lobes, and deeper blue corollas. Recent authors appear to be inclined to treat the two as varieties, though this may be inconsistent with general concepts of species in the genus.

Habitat and Management Implication:

L. gattingeri is abundant locally on thin, seasonally moist, sticky clays such as form on and around flat-bedded limestones. It is a plant of full sun or light shade, associated with other plants of open limestone glades in middle Tennessee such as various vernal grasses, carices, Scirpus lineatus, Eleocharis compressa, E. tenuis, Juncus filipendulus and other rushes, Nothoscordium, Hypoxis, Schoenolirion, Delphinium virescens, Arenaria, various Leavenworthia, Lesquerella, Sedum pulchellum, Petalostemon gattingeri, Psoralea subacaulis, Opuntia, Oenothera triloba, Viola, Amsonia, Scutellaria parvula, Verbena canadensis, Houstonia, Hedyotis nigricans, and a variety of composites. Usually it is most abundant in the open areas along intermittent streams or at edges of moister inwash depressions.

The forest type is a Juniperus disclimax, precursor to a mixed hardwood assemblage involving oak (Q. shumardii, Q. muhlenbergii, Q. imbricaria, Q. alba, Q. stellata), hickory (Carya ovata, C. caroliniana-septentrionalis, C. cordiformis) elm (U. americana, U. serotina, U. alata, U. rubra), hackberry, ash (F. quadrangulata, F. americana), Sugar Maple, Persimmon, etc. under which and invading openings are Rhus aromatica, Rhamnus caroliniana, Sassafras, "Svida" dogwoods, Symphoricarpos, Rubus and various vines in Lonicera, Smilax, Rhus, Berchemia, etc. This woody stage succeeds on the limestones as soil develops there, ultimately shading out the herbs of open glades. It was kept in check naturally through fire and erosive forces. The greatest risks to this sort of habitat come from urban and industrial expansion, conversion of open areas to pasture, particularly if some tough perennial pasture grasses such as fescue, bluegrass, or orchard grass are promoted.

References:

McVaugh, Rogers. 1936. Studies in the taxonomy and distribution of the eastern North American species of Lobelia. Rhodora 38: 241-263, 276-298, 305-329, 346-362.

_____. 1942. Lobelia in North Am. Fl. 32A. New York.

Small, J.K. 1933. Manual of the southeastern flora, pp. 1291-1295.

SPECIES: Lobelia gattingeri A.Gray

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		NA	NA	NA			NA	
Damage								X
No Lasting Effect	X							
Beneficial if Done Properly					X	X		

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Distribution of:

Lobelia gattingeri A.Gray



Arenaria cumberlandensis Wofford & Kral

Status: Endangered

Technical Description:

Strongly tufted, delicate, smooth perennial from a slender taproot, perennating by short, basal offshoots.

Stems: erect or spreading, forming small cushions of decumbent bases, (8-) 10-15 (-20) cm high, very slender, 0.4-0.8 mm thick, terete, the nodes swollen, close-set toward plant base, internodes progressively elongating upward on stem, thus branching in the inflorescence or terminating in a single flower stalk.

Leaves: opposite, estipulate, gradually reduced in length and width upward on stem, the largest near base, spreading or spreading-recurved, (1-) 2-3 (-4) cm long, mostly 1-3 mm wide, linear-oblongate or linear-spathulate, obtuse to broadly acute, entire with a narrow glassy margin, attenuated or narrowly cuneate to a narrow but clasping base, thin, equally bright green on both sides, the midrib and veins around midrib a single row, the areoles on either side elongate; leaves at base of pedicels shortest, usually 1 cm or less long, linear, spreading or ascending.

Flowers: regular, bisexual, solitary at stem tips or 2, rarely 3 and subcymose, the pedicels capillary, 5-10 times as long as flowers; calyx broadly campanulate, truncate and strongly indented at base, the 5 distinct sepals 2.5-3.0 mm long, broadly oblong, slightly boat-shaped, apically obtuse or rounded, green and inconspicuously 3-veined, with narrow, scarious, entire margins; petals 5, distinct, at early flowering forming a broad bell, becoming more wide-spread, the spreading blades mostly ca. 5 mm long, broadly oblong or obovate, apically rounded broadly or truncate, slightly if at all emarginate, erose, tapering at the wide-shaped base, white, mostly with 5 green main veins; stamens usually 10, distinct, spreading-ascending, the filaments linear-tapering, ca. 2.5-3.0 mm long, white, the anthers nearly round, the 2, pale-yellow, reniform anther sacs ca. 0.4 mm long; ovary at anthesis broadly ovoid, ca. 1.5 mm long, pale yellow-green, its apex strongly indented, the styles 3-4, distinct, at anthesis 1.0-1.2 mm long, erect or slightly spreading, the linear, excurved, minutely clavate-hairy stigmas ca. 0.5 mm long.

Fruit: Capsule broadly ovoid, enclosed by the persisting, erect calyx and withering petals, 3.0-3.5 mm long, dehiscing to 3-4 pale-brown, thin but firm valves, these narrowed at apex, there thickened, rounded, slightly incurved; seeds numerous, the funicles all from a short columnella, tearshaped, turgid (swollen), with an indentation medially at middle of coiled embryo, 0.5-0.7 mm long, the seed coat reddish-brown, reticulate, the network a strong system of irregular, wavy ridges.

Distribution and Flowering Season:

Shaded sandrock ledges and bluffs, northern Cumberlands of Tennessee in 4 counties (Fentress, Morgan, Pickett, Scott); flowering mostly from early July through August.

Special Identifying Features:

A. cumberlandensis most resembles A. groenlandica, a sandwort of more northern latitudes or at higher elevations of the southern Appalachians, or extremes of A. glabra, a common spring flowering species of granite and sandrock glades in the Carolinas, Georgia, Alabama and Tennessee. However, it may be distinguished from either of these by its longer, broader, thinner, veinier leaves, leafier upper stems, which produce fewer flowers as a rule, and by its distinctive seed sculpture. Also the flowering time of A. cumberlandensis is summer, which means that it overlaps not at all with A. glabra or any other Arenaria of the complex except A. groenlandica. In the case of the last, a plant of full sun in high southern mountains, there is a distinctive difference in habitat, with A. cumberlandensis being found only in shaded sites. A. glabra, while a similarly delicate plant of full sun, is a true annual.

Habitat and Management Implication:

As noted above, A. cumberlandensis is a plant of moist sandstone ledges and overhangs, is referred to as a "rockhouse" plant. The substrate is a thin, moist layer of nearly pure sand on which are many bryophytes, several rock ferns and fern allies, including Selaginella apus, Lycopodium porophyllum, L. lucidulum, Dryopteris, Adiantum, Cystopteris, Asplenium montanum, A. trichomanes, etc. Herbaceous flowering plant associates of particular and consistent note are Parietaria pensylvanica, Boehmeria cylindrica, Pilea pumila, Silene rotundifolia, Thalictrum clavatum, Cardamine pensylvanica, Eupatorium (Ageratina type), Agrostis, Panicum, many Carex. The moist ravines and creekbanks support a rich forest cover. White pine and Canada Hemlock dominate the gymnosperms, the hardwoods comprise a rich mixed mesophytic assemblage typical of Appalachian cove forest, with an understory of Cornus, Rhododendron maximum, Clethra acuminata, Ilex, and highbush blueberries such as Vaccinium erythrocarpon, V. constablei, etc. The upper ravine slopes and ridges support a very different forest, namely oak-hickory pine, the White Pine with a strong admixture of Pinus virginiana, P. echinata, and understory woody plants such as Oxydendrum, Cornus florida, Sassafras underlain by lowbush Vaccinium, Gaylussacia brachycera, G. frondosa, Epigaea, Gaultheria, dewberry. The Arenaria does not come up into these drier sites or even to the higher ledges of the ravines where conditions are drier, lighter; instead it is confined to sites where the microclimate is cool, deeply shaded, more humid.

The primary danger to such habitat as this is from logging of ravine and bluff woodlands, which would admit too much light, therefore heating and drying the substrate, as well as subjecting it to erosion. In area I have seen where such clearings have been made, A. cumberlandensis is not in evidence, though it persists along the same drainages where such logging has not taken place. Populations within Pickett State Park, where most of the plants have been collected and observed, have sustained some damage in that some of the more spectacular ravines have had trails constructed into them, thus some bluff ledges have been impacted by hikers who wander off marked trails.

References:

- Wofford, B.E. & R. Kral. 1979. A new Arenaria (Caryophyllaceae) from the Cumberlands of Tennessee. Brittonia 31 (2): 275-260.

SPECIES: Arenaria cumberlandensis Wofford & Kral

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy	X				X	X		
Damage		NA	NA	NA			NA	
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Range of:

Arenaria cumberlandensis Wofford & Kral



CARYOPHYLLACEAE

Geocarpon minimum K.K. Mackenzie

Status: Endangered

Technical Description:

Diminutive, smooth, ephemeral annual from a small, slender taproot.

Stems: simple or branching only at very base, the branches few, at most 4, erect or spreading-ascending, mostly 3-4 cm high, less than 0.5 mm thick, terete, greenish-brown or strongly suffused with red, the few lowermost nodes close-set, above this to around 1 cm apart, each node floriferous, the internodes zig-zag.

Leaves: opposite, the lowermost pairs narrowly oblong, to 3-4 mm long, their bases connate-sheathing, the margins entire, somewhat involute, the apices acute; bracteal leaves triangular-connate, keeled, 2.5-3.5 mm long, acute, strongly red or purple-tinged.

Flowers: usually 1/node and alternate, subsessile, erect, 3-4 mm long, bisexual, regular, funnel-form-campanulate; sepals 5, 3-4 mm long, reddish or reddish-green, joined half their length, the subequal lobes triangular-ovate, nearly erect or slightly spreading, acute, scarious margined, the lobe bases slightly overlapping, the backs each with 1 strong median nerve and a pair of fainter laterals; petals absent; stamens 5, the slender but flattish-based filaments arising just below the sepal lobe sinuses, terminating in minute, bilocular, subglobose anthers; staminodes 5, rudimentary, scale-like, arising alternately at level of the filament bases; ovary superior, lance-ovoid, somewhat trigonous, about the length of the sepals, greenish, the narrow apex at anthesis 3-lobed, minutely glandular-toothed or retuse, the style lacking, the stigmas minute, recurved, arising subapically at the sinuses of the apical ovary lobes.

Fruit: Capsule not much longer than the ovary, splitting along the 3 wirelike valve margins about halfway down the fruit from the apex to expose the numerous, long-funicular seed; seeds yellowish-green, translucent, ovoid to nearly round, ca. 0.5 mm long, the rounded backs muriculate (minutely pebbled), the sides minutely and narrowly striate-cancellate.

Distribution and Flowering Season:

Fine sandy silty substrates, moist exposures of soil, mostly over siliceous rock in glades, very infrequent, southwestern Missouri and in two counties in southern Arkansas; flowering from March through April.

Special Identifying Features:

Geocarpon is monotypic. K.K. Mackenzie, who described it (1914) from Missouri material collected by E.J. Palmer opined that it belongs to the tribe Aizoideae of the Aizoaceae. Later (1950) E.J. Palmer and J.A. Steyermark wrote an elaborative paper in which G. minimum was placed instead in the Caryophyllaceae in that, to be where Mackenzie placed it, it would have to have stipules and a different fruit dehiscence (circumsessile rather than longitudinal). On the other hand, many Caryophyllaceae do lack stipules, may (contrary to the earlier opinion of Mackenzie) have a gamosepalous calyx, often tend to have the same reduction series from 10 to 5 stamens, and

all provide a 1-locular ovary with a free-central placentation. Thus, the final disposition of Geocarpon has been to place it near Scleranthus in between subtribe Sabulininae of tribe Alsineae and the Scleranthaeae, family Caryophyllaceae.

Habitat and Management Implication:

Steyermark, who found most of the Missouri stations for this rare plant, noted that the habitat for it was primarily sandstone glades, where ledges of fine sandstone, interbedded with shale, are exposed along small streams, where a thin layer of humified silty sandy accumulates and appears to be held in an early successional stasis. Surrounding area where deeper soils allow, is savanna, with Andropogon, Panicum scoparium, Setaria, Rhynchospora, Scleria, Fimbristylis, Carices, Tradescantia, Anemone caroliniana, Rubus, Baptisia leucophaea, Centunculus, Castilleja, Rhexia, Cirsium, this primarily grass-sedge landscape dotted with hardwoods such as Diospyros.

The Arkansas localities, close together along the Bradley-Drew County line, are floristically different in some regards. First the sites are, as in Missouri, small areas of mineral earth, in this case small, level openings in grass-sedge on Lafe (Bonn) soils. This soil is a tuffaceous sand, yellowish or yellowish-reddish-brown with iron oxides, and the areas are what at one time were beds of shallow lakes. Low points are very wet, forested with cypress-tupelo interspersed with Red Maple, Carolina Ash, Hackberry, Green Ash, Swamp Privet and lowland oaks, the shallower arms of the old bed dominated by a grass-sedge formation similar in makeup to that described by Steyermark (Andropogon, Panicum, Rhynchospora, Scleria, Carex, often the same species), but this landscape dotted with Sabal minor which gives it a much different look. The rises, which were probably once shores and islands are forested by upland oaks, hickories, hackberry, White Ash, Loblolly Pine, with both high and lowbush blueberries, Rubus, Smilax, Cornus, Crataegus. Here and there in the grass-sedge formation are small open exposures of Lafe soil, these on frequent occasions washed by high waters during wet periods but not for long periods of time, often lichen-encrusted, and during the time of flowering of Geocarpon populated thinly by Houstonia minima, Plantago pusilla, Hypoxis hirsuta, Cerastium, Viola rafinesquii, Oenothera linifolia, Krigia, etc. Isoetes melanopoda appears in small patches, together with some dichanthelium Panicum, Agrostis elliotii, A. hyemalis, Nothoscordium and the grass-sedge environs often have large patches of the rather rare Schoenolirion wrightii Sherman, another endangered species.

Some of this old lake bed has been cultivated in the past and some is presently pastured, but the site is of low agricultural quality. The area left as it is will continue to support good populations of Geocarpon. The poor and acid substrates continue to erode to expose new patches of mineral siliceous earth on which succession appears to be slow. There is also considerable evidence that fire was a factor in keeping this savanna, and this, if included in management of the tract would act to reduce woody invaders as well as to provide impetus to the erosional forces creating bare patches for the Geocarpon and other shallow-rooted herbs of full sun.

On the other hand, a more intense pasturing would be very destructive, as would any conversion to row planted pine (for which the site is poor!)

References:

Mackenzie, K.K. 1914. A new genus from Missouri. *Torreya* 14: 67-68.

Palmer, E.J. & J.A. Steyermark. 1950. Notes on Geocarpon minimum Mackenzie. *Bull. Torr. Bot. Club* 77 (4): 268-273.

Steyermark, J.A. 1958. Another station for Geocarpon minimum. *Bull. Torr. Bot. Club* 85 (2): 124-127.

SPECIES: Geocarpon minimum Mackenzie

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X	X	X			X	X
Damage								
No Lasting Effect					X	X		
Beneficial if Done Properly	X							

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Geocarpon minimum Mackenzie



Paxistima canbyi Gray

Status: Threatened

Technical Description:

Low, lax, mat-forming shrub 2-4 dm high, increasing by rooting from the lower nodes and adventitiously along the prostrate older branches, the roots slender, shallow, fibrous.

Shoots: prostrate, sprawling or decumbent-based, slender, the older growth usually buried in litter, the rebranching often in pseudowhorls; bark of older growth dark brown, thin, forming irregular patterns of rectangular patches over the dull yellowish inner bark, that of newer growth paler brown, that of leafy shoots light brown, these shoots ascending or erect at least at tips, often subquadrangular, with 4, low longitudinal corky ridges, here ca. 1.0-1.5 mm thick, the nodes numerous and close together.

Leaves: opposite and close-set, spreading, evergreen, simple, subdecussate, stipulate, the stipules narrowly triangular-subulate, or linear, dark brown, minute, variably deciduous; petioles short, less than 1 mm long, erect-based, arching outward distally, the rounded backs pebbled; leaf blades leathery, oblong to narrowly elliptic, oblanceolate, narrowly cuneiform or linear, mostly 1.5-2.0 cm long, 2.0-5.0 mm wide, apically acute or (more often) rounded, strongly revolute-margined, serrulate with strongly incurved or erect, callus-tipped teeth, the base rounded, short-attenuate, or cuneate, the upper surface dark lustrous yellow-green with midnerve prominent, the pinnate laterals indistinct, the lower surface pale green, duller.

Inflorescence: The upper few to several nodes developing axillary, imbricate inflorescence buds, these elongating to become short, few-flowered, erectish, determinate racemes, the flowers of the lower nodes opposite, the terminal cluster a cymule of 3, or inflorescence a simple cymule of 3, the bracts subdecussately arranged, scale-like, triangular, the pedicels slender, terete, ascending, bibracteolate at base, mostly 3-4 mm long.

Flowers: regular, bisexual, small, the sepals 4, joined at very base, spreading, broadly ovate, ca. 1 mm long, broadly acute, somewhat cupped at the narrowed apex, greenish tinged with maroon; petals 4, distinct, strongly spreading, broadly ovate to suborbicular, attached to receptacle under the flange of a broad, green disc, slightly longer than the sepals (1.5 mm long), apically rounded, the margin erose, the surface bright maroon; stamens 4, hooked to the receptacle under notches in the broad margin of a large, flattish, green disc, this round, ca. 1.5 mm broad, the filaments stubby, ca. 0.4 mm long, erect, the anthers bi-gibbous, pale, the 2 round locules ca. 0.4 mm long; ovary superior but fused with disc so that only the very short, erect style and the shallowly bilobed stigma protrude.

Fruit: Capsule broadly ellipsoidal, slightly longer than 4 mm, 2-valved, 2 loculed; seeds pale, arillate, 1/locule.

Distribution and Flowering Season:

Moist to dryish, shaded ravine slopes and bluffs, Appalachians and Appalachian Plateau, southeastern Ohio, and southern Pennsylvania southward through the Virginias into Kentucky and North Carolina

(here persisting in an old nursery site!) Flowering mostly in April, May.

Special Identifying Features:

The only other species of this genus in North America is western. Paxistima (usually spelled Pachystima) is distinguished from other native members of the Celastraceae by its low shrubby habit (it is our smallest member of the family), its oblong, unlobed fruit, its 2-locular (rather than 3-5-locular) ovary in which the ovules, later seeds, have a basal aril.

Habitat and Management Implication:

The common name "Cliff-green" describes the habitat rather well, in that this small shrub is most often found on steep, rocky ravine slopes or bluffs along Appalachian rivers and streams. The substrate is usually a shallow soil layer, very much humified, somewhat acid, although the underlying and surrounding rock is often calcareous or a calcareous shale. Sometimes the habitat is more exposed and drier, the forest open and high in yellow pine. More often the overstory is fairly heavy, may be a mixture of hardwoods such as *Quercus rubra*, *Q. alba*, *Ulmus*, *Acer saccharum*, *A. rubrum*, *Aesculus octandra*, *Tilia*, *Fraxinus*, etc. with gymnosperms such as *Pinus strobus*, *Tsuga canadensis*, *Thuja occidentalis*, sometimes *Pinus virginiana*, *P. echinata*, and an understory of *Rhododendron maximum*, *Kalmia*, *Clethra*, *Halesia*, various highbush *Vaccinium*. Herbaceous associates are quite varied but usually include a variety of ferns such as *Dryopteris marginalis*, *D. intermedia*, *Adiantum*, *Woodsia*, *Asplenium*, *Lycopodium*, *Trillium* (particularly *T. erectum*, *T. undulatum*), *Disporum*, *Polygonatum*, *Uvularia*, *Erythronium*, *Hepatica*, *Anemone quinquefolia*, *Hexastylis*, *Sanguinaria*, various umbellifers, etc.

These steep slopes, particularly toward their bases, may support fine specimens both of hardwoods and softwoods. Logging of such areas, if involving a clear cut, is highly destructive of the Paxistima habitat, in that the increased light promotes excessive drying as well as the advent of unwelcome woody weeds in genera Smilax, Lonicera, Rubus, etc. Also, such operations increase the likelihood of erosion of the thin humified layer the Paxistima roots in, so that the plants are likely to dislodge. In fact, these shrubs tend to increase by a form of air layering taking place along the prostrate shoot bases and branches, this rooting promoted by a loose, moist, surrounding duff. It should be recommended that logging of such areas be selection or group selection.

References:

Fernald, M.L. 1950. Gray's manual of botany, ed. 8: p. 983.

Massey, A.B. 1940. Discovery and distribution of Pachystima canbyi Gray. *Castanea* 5: 8-11.

Radford, A.E., H.E. Ahles & C. Ritchie Bell. 1968. Manual of the vascular flora of the Carolinas, p. 685.

SPECIES: Paxistima canbyi A.Gray

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy						X		
Damage	X	NA	NA	NA			NA	
No Lasting Effect					X			
Beneficial if Done Properly								

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Distribution of:

Paxistima canbyi Gray



CONVOLVULACEAE

Cuscuta Harperi Small

Status: Endangered

Technical Description:

Annual parasitic vine, the stems closely twining, filiform, smooth, orangish-yellow, putting down haustoria at frequent intervals, sometimes forming small mats of growth over clumps of host herbs.

Leaves: alternate, few on slender twining stems, usually subtending inflorescences or bracteal, mostly scale-like, narrowly triangular, acute, entire, clasping-based, 0.5-0.6 mm long.

Inflorescence: few-flowered, the 2-5 (-7) flowers either in a subcymose arrangement or in a short raceme, the peduncle mostly an extension of a slender, twining branch and of various lengths, the pedicels mostly 1 mm long or less, sparsely muriculate, sometimes bearing a basal bract.

Flowers: bisexual, regular; calyx broadly and shallowly funnelform, with sepals 3-5 (mostly 4), very thin, pale yellowish-brown, ca. 0.6 mm high, united about 1/2 their length, the lobes broadly low-triangular, the apex obtuseangled, the surface externally scattered-muriculate; corolla short-campanulate, yellowish-white, at anthesis 1.0-1.2 mm high, the lower 1/3 united, the lobes slightly spreading, broadly ovate, the tips narrowly rounded, the blade cupped and incurved; stamens alternating with corolla lobes, arising within the corolla just below the lobe sinuses and above an oblong, fimbriate-margined scale set lower in corolla tube, the filaments erect, ca. 0.5 mm long, linear, slightly tapering, the anthers ca. 0.3 mm long, greenish, broadly ellipsoidal, sub-basifixed, introrse, the narrowly ellipsoidal anther sacs parallel; ovary superior, ovoid, about the length of the calyx, apically indented and with a low annulus, the styles 2, distinct, strongly spreading, the stigmas capitate.

Fruit: capsule broadly ovoid, very thin-walled, translucent, pale-brown, with an irregular dehiscence, at maturity ca. 1.2-1.3 mm high, the divaricate styles persisting, the ovules apical, usually reduced to 1 or 2 seed, the seed light brown, broadly obovoid or nearly round, mostly 1.0-1.2 mm long or broad, brownish, minutely papillate.

Distribution and Flowering Season:

sandrock outcrops, where parasitic on outcrop herbs, Cumberland Plateau and Blue Ridge, mostly northeastern Alabama with possible outliers in northwestern Georgia and southern Alabama; flowering mostly from September to frost.

Special Identifying Features:

The genus Cuscuta is one of the most difficult in a taxonomically difficult family. However, C. harperi is a distinct species of subgenus Grammica, which has the styles distinct to the base and with capitate stigmas. Within Grammica it is part of the complex Cleistogrammica in that its capsules are not circumsessile, but

remain closed until rupturing irregularly. Within Clistogrammica it is distinguished by its extremely slender-stemmed habit, its very tiny flowers (mostly not much exceeding 1 mm in height) which are mostly 4-parted (unlike most others of the complex, in which flowers are 5-parted). The corolla lobes have uniquely inflexed tips. The capsule is broadly ovoid.

Habitat and Management Implication:

C. harperi is found mainly in areas of sandstone outcrop and is parasitic on outcrop plants such as Bigelowia nuttallii (Chondrophora virgata), Liatris microcephala, Crotonopsis elliptica, Hypericum gentianoides, all of which are frequent on such outcrops. The outcrops themselves may be small or several acres in irregular extent, with frequent shallow depressions or shallow runoff channells, these rimmed with herbaceous low vegetation dominated by annual grasses such as Aristida dichotoma, A. longispica, Sporobolus, Panicum flexile, Digitaria, interspersed with perennial Andropogon, Panicum, Paspalum, various annual and perennial Cyperus, Fimbristylis, Bulbostylis, succulents such as Opuntia, Talinum, Agave and forbs such as Crotonopsis, Hypericum, Polygonum tenue, and many composites including some rare and local ones such as Coreopsis pulchra, Helianthus longifolius. The commonest composites however are Liatris microcephalus and Bigelowia, the usual hosts for the dodder.

Fortunately the greatest known abundance of this rare dodder is on the outcrops bordering the Little River Canyon in Cherokee, DeKalb and Jackson Counties of Alabama and therefore much of its area is in state ownership. The main danger is to privately owned contiguous areas of outcrop, some of which are part of low-grade pasture with the vegetation badly trampled and grazed. Historically the thin oak-pine forest around the outcrops and the heath dominated shrubby understory of these same areas were periodically subjected to and kept open by natural woods fires. With fire protection for woodlands surrounding the sandstones (or granites in the case of the type locality!) succession onto them may be more rapid than it once was. Cutting of the adjacent oak-pine woodlands may have added potential area.

References:

- Small, J.K. 1933. Manual of the southeastern flora, pp. 1092-1094.
- Yuncker, T. G. 1921. Revision of the North American and West Indian species of Cuscuta. Univ. Ill. Biol. Monogr. 6 (2-3): 1-142.

SPECIES: Cuscuta harperi Small

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy								X
Damage No Lasting Effect	X	NA	NA	NA			NA	
Beneficial if Done Properly					X	X		

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Cuscuta harperi Small



CYPERACEAE

Cyperus granitophilus McVaugh

Status: Threatened?

Technical Description:

Tufted, sweetly fragrant, annual sedge, the foliage smooth, the roots slender, fibrous, reddish, shallow.

Culms: erect to spreading, 3-angled, forming small dome-shaped mats, from base to spikelet clusters mostly 5-10 (-15)

cm long, shorter than longer leaves, pale green, aging brown.

Leaves: in 3 ranks, all cauline but concentrated toward culm base, the longest to 17 cm long, erect or spreading, the youngest scale-like, mostly sheath; mature foliage leaves with sheathes $1/4-1/6$ the blade length, much broader than blades, keeled, multiribbed with broad, thin (scarious) maroon, purplish or brownish borders or entirely reddish, converging acutely to narrowly linear blades, these gradually tapering to a narrowly acute apex, the tip keeled, the margins and midrib pale, wirelike, the nerves otherwise inconspicuous, the surfaces pale green, aging maroon or brown.

Inflorescence: spikelets numerous, sessile in a single dense, headlike hemispheric cluster or sometimes with 2-4 additional, similar, short-peduncled clusters, subtended by 4-5 linear, tapering, spreading unequal leaflike bracts, these sometimes full as long as culm leaves.

Spikelets: linear or lance-linear, 5-10 mm long, 4-5 mm wide, the bracts distichous (1 plane), many (8-12), overlapping, the fertile ones lanceolate or narrowly ovate, ca. 3 mm long, keeled, long-cuspidate, the tips ascending to somewhat spreading, the scale body thin save for the prominent (when young, greenish) midrib and the 4-5 strong lateral nerves, the whole scale aging maroon or brown; florets naked, perfect, but stamens maturing first, 1/floret, the anthers narrowly lineal, nearly 1 mm long; ovary at first lineal, 3-angled, the slender style branching above or at middle to 3, filiform, spreading, exerted stigmatose branches.

Fruit: Akene trigonous, mostly narrowly to broadly cuneate-obovoid ca. 0.8-1.0 mm long, the angles rounded, the apex broadly rounded, somewhat shouldered or subtruncate, the 3 faces flattish save apically where somewhat concave, the surface reddish-brown or grayish, very finely cancellate or minutely pebbled in rows.

Distribution and Flowering Season:

Edges of shallow pools or on banks of intermittent streams and seeps in, on or around sandstone or granite outcrops, Piedmont, southern Blue Ridge, Cumberlands and Interior Low Plateau, middle Tennessee east to South Carolina, south into Georgia and Alabama; flowering and fruiting from June to frost, depending on available moisture.

Special Identifying Features:

McVaugh (1937) makes a chart which has most critical differences between this and C. aristatus Rottb., the closest species to it. He notes that C. granitophilus is usually stouter, has the bract tips erectish or less spreading, the bract sides 4-5-nerved

(rather than 3 or rarely 4-nerved), the akene lacking a short tip (present in C. aristatus). He fails to note another strong difference, namely the much longer, narrower anther. The only other Cyperus with which this taxon could be confused is C. cuspidatus, a tinier weed of moist sandy waste places of the Coastal Plain and which has smaller scales whose apices are strongly notched at either side of the strongly recurved, aristate tips. Its akenes are obovoid, but not wedge-like.

Habitat and Management Implication:

C. granitophilus was assumed by McVaugh to be confined to granite outcrop areas in the Piedmont of Georgia. Since then it has been found on or around a wide variety of outcrop types in more physiographic provinces. Its standard habitat is a thin, seasonally moist or wet, inwash substrate over rock or outwash areas nearby. It is a plant of full sun, is shaded out by competing perennial herbs, and certainly by invading woody vegetation. On the outcrops its commonest associates are various bryophytes, Isoetes, Panicum lithophilum, P. flexile, Sporobolus vaginaeflorus, Crotonopsis elliptica, Talinum, Oenothera fruticosa, Portulacca, Hypericum gentianoides, Juncus georgianus and other rushes, Rhynchospora, Fimbristylis, Allium, and several showy composites including Coreopsis, Liatris microcephala, Bigelowia, Viguiera porteri, etc. It is definitely a lower successional level, pioneer plant, abundant some years when rainfall is normal, rarer during drought cycles. It has a high reproductive potential, can reach fruit from seed in a few weeks. It is in little danger on outcrops save from trampling from livestock or people, or from quarrying of the rock. In the vicinity of Atlanta however, considerable acreages of outcrop are being covered by new homes or by industrial construction.

References:

- Godfrey, R.K. & Jean Wooten. 1979. Aquatic and wetland plants of the southeastern United States. Monocotyledons. Athens.
- McVaugh, Rogers. 1937. A new species of Cyperus from the granite region of central Georgia. Castanea 2: 103, pl. 1, figs. 4-8.

SPECIES: Cyperus granitophilus McVaugh

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		NA	NA	NA			NA	
Damage								X
No Lasting Effect	X							
Beneficial if Done Properly					X	X		

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Distribution of:

Cyperus granitophilus McVaugh



Rhynchospora culixa Gale

Status: Endangered

Technical Description:

Tufted perennial sedge, mostly 5-8 dm tall from a shallow, diffuse root system, perennating by lateral offshoot buds.

Culms: erect, slender, wand-like but somewhat stiffish, the nodes close-set proximally, remote distally, the internodes subtrigonal, the angles comprised of rounded nerves, the level interfaces shallowly and narrowly ribbed, the surfaces smooth, pale green, pale yellow green or tannish at the slightly contracted nodes.

Leaves: somewhat crowded toward the base, the lowest ones chaffy, short-linear, scale-like, persistent, the largest up to half as long as the culm, erect or ascending, the sheathes continuous, tubular, less than 1/5 as long as blades, the rounded backs pale green, multiribbed, smooth, the ventral area scarious, tannish, at the orifice slightly darker, the thin margin truncate or slightly concave, the blades narrowly linear, mostly 2-3 mm wide tapering above midblade gradually to a slightly callused, broadly acute, scabrous apex, the margin scabro-ciliate, the surface pale green with only the mid-vein strongly raised.

Inflorescence: spikelets lance-ovoid or broadly ellipsoidal, narrowly acute, 1-2-flowered, ca. 4-5 mm long, a pale reddish-brown, few in cymules, the cymules few-to-several per complex on ascending or erect, unequal branches, with 1-3 complexes lateral to main axis on ascending slender peduncles, each peduncle subtended by a bracteal leaf similar to a foliage leaf but smaller and shorter, plus a terminal bracteate complex, these complexes confined to the upper 1/4 of the culm, the lower ones more distant; each cymule stalk subtended by a scale-like, linear-subulate bract and enveloped at base by a short-tubular, scarious prophyll.

Scales per spikelet few, tightly imbricated, the lowermost sterile, emarginate and strongly awned, the awns scabrid-margined, the fertile scales broadly ovate, ca. 3.0-3.5 mm long, strongly cupped, the apex bluntly acute, often mucronulate, the margins very thin, pale, the surface with only the midnerve evident.

Florets: perianth bristles usually 6, antrorsely barbellate, unequal, the longest reaching about to middle of ripe akene; stamens 3, the flattened filaments supporting narrowly oblong, erect, basifixed anthers; style slenderly linear, 2-branched at about the middle.

Fruit: akene in outline broadly elliptical or obovate, ca. 1.5-2.0 mm long from base to tubercle tip, at thickest point biconvex but not tumid (in cross-section narrowly elliptic), pale brown, irregularly wavy-transverse-rugulose, the intervals narrower than the ridges, these and the ridges finely vertically lined; tubercle depressed-conic, grayish-spongy, ca. 0.4-0.5 mm high, sometimes apiculate, the basal rim definitely buttressed (forming a low "cliff" rather than having an indentation or groove around its base!)

Special Identifying Features:

R. culixa, according to Gale (1944) is in the series Harveyae, which comprises only 4 species, all of which have the tubercle of the akene definitely buttressed. It is the lowest plant of the four, is the most slender, with the upper culm leaves much more reduced. While the other three species (R. megalocarpa, R. harveyi, R. grayii) have akenes that are finely to coarsely pitted with concave alveolae, this species in addition to being finely alveolate, has a low but very evident cross-ridging of its fruit surface.

Distribution and Flowering Season:

Pineland savanna and edges of flatwoods bogs, evidently very rare and local, Coastal Plain, southwestern Georgia and northwestern Florida; flowering and fruiting from late May into early July.

Habitat and Management Implication:

This rare sedge, which I have seen only once in the field, seems to take moister ground than others of its complex do. Actually R. megalocarpa is a coarse beakrush of deep dry sands of Longleaf Pine and Sand Pine sandhills or sandscrub, R. grayii is commonest in sandhills also with an affinity for the Longleaf pine-Turkey Oak formation, while the more ecologically ample R. harveyi is found in prairies, upland clearings and upper edges of boggy swales from the prairie provinces in the mid-West eastward through much of the Coastal Plain. R. culixa however appears to prefer a moist substrate such as in pine flatwoods savanna or along the edges of hillside seep bogs in Longleaf Pine hills. Locality data from the few existing collections show that it is part of a grass-sedge complex that would include many more species of Rhynchospora (R. divergens, R. pusilla, R. rariflora, R. globularis, R. torreyana, R. schoenoides, etc.), Fimbristylis puberula, Scleria, various Cyperus, many Dichanthelium Panicum, P. agrostoides, P. tenerum, Paspalum laeve, P. lentiferum, many Aristida, and a variety of Andropogon, Juncus, Xyris, Aletris, many bog orchids, Polygala, Rhexia, Sarracenia, Eriocaulon, Lachnocaulon, Lachnanthes, etc. The substrate is a black sandy peat of high hydroperiod. The commonest savanna trees are Longleaf Pine, Pond Cypress, Pond Pine, Nyssa biflora, Liquidambar, Red Maple. In the shrub layer are numerous heaths in genera Vaccinium, Lyonia, Leucothoe, Lyonia, also Myrica, Ilex glabra and coriacea, Rubus, Smilax. Saw Palmetto is locally common, together with large clones of Cyrilla. The grass-sedge openings were created by woods fires, and removal of fire as a factor promotes invasion of the clearings by trees and shrubs.

Such savanna and bog habitat in the Coastal Plain is rapidly being drained, this followed by clear cutting and mechanical site preparation for pine plantation or for conversion to improved pasture or row crop agriculture. In any event the result is total destruction of habitat for this rare sedge and many other rarities as well.

References:

Gale, Shirley. 1944. Rhynchospora, sect. Eurhynchospora, in Canada, the United States and the West Indies. Contr. Gray Herb. CLL.

SPECIES: Rhynchospora culixa Gale

Expected* Effect on Habitat	Prescribe Burn	Doza or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X		X			X	
Damage			X					X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Do not drain!

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Rhynchospora culixa S. Gale



CYPERACEAE

Rhynchospora globularis (Chapm.) Small
var. saxicola (Small) Kukenthal

Rhynchospora saxicola Small

Status: Threatened

Technical Description:

Perennial, slender Beak-rush from a shallow, diffuse-fibrous root.

Culms: usually stiffly erect, slender, mostly 2-4 dm high, in small tufts or densely caespitose, triangulate, smooth, sometimes with more than 3 sharp ridges and sulcate distally, usually with 2, short erect or ascending lateral branches toward tip.

Leaves: usually in 3 planes, more crowded, largest and longest toward base of culm, there mostly $1/3-1/2$ as long as the culms, with sheathes overlapping, less than $1/5$ the total leaf length, the backs rounded or slightly keeled, multiribbed, the margins narrow, scarious, this border widening distally to junction with blade, there forming a convergent pair of low, thin auricles, the blades narrowly linear, flat or somewhat folded, 1.5-3.0 mm wide, above the middle gradually tapering to an abruptly acute, harsh-margined apex, the margins at least distally scabrid, the backs with a few low ribs, the upper surface with only the midnerve evident; leaves upward on culm progressively shortening, with shorter sheathes, and more distant, grading into bracteal blades.

Inflorescence: spikelets ovoid, or ellipsoidal, mostly 1-3-flowered and fruited, ca. 3 mm long, acuminate, a rich glossy pale reddish-brown, in small clusters (cymes), usually 1 terminal and 2 lateral and distant in the upper $1/3$ of the culm, the slender lateral peduncles subtended by erect or curvate, closed-sheathed, narrowly linear bracteal leaves, all cymes either simple and made up of but 1 cymule or weakly compound with 2 or a few more cymules, the central often sessile, prophyllate, the others on stiff peduncles of varying lengths; individual cymules of 1-few spikelets, usually subtended by chaffy, linear bracts grading into spikelet scales; outer spikelet scales barren, often scabridulous-awned or cuspidate; fertile scales broadly ovate to suborbicular, thin, only the midnerve evident, apically obtuse, the margin entire, the backs strongly rounded.

Florets: perianth bristles slender, stiffish, antrorsely barbed, usually 6, mostly overtopping akene, often the tubercle; stamens 3, the filaments flat, erect, the linear anthers basifixed, erect, bilocular; style 2-branched from about the middle.

Fruit: akene broadly obovoid, tumid-lenticular (in cross section biconvex, not round), including tubercle 1.3-1.6 mm long, 1.1-1.3 mm wide, with several undulant and interrupted or anastomosing cross-ridges, the intervals between strongly etched by numerous sharp, fine vertical ridges to form a system of rows of parallel-sided rectangular alveoli, the surface a dark brown or chestnut brown, lustrous; tubercle (persistent style base) grayish, strongly depressed-conic or discoid, at most 0.3 mm high, not buttressed but invaginated around the rim, bearing at the depressed apex a small apiculus.

Distribution and Flowering Season:

Moist open areas on and around granite or grit outcrops, Piedmont and inner Coastal Plain, Georgia; flowering mostly in June but intermittently well into July.

Special Identifying Features:

This is seemingly but one of the radiate extremes from a large matrix species, R. globularis (Chapm.) Small, and perhaps best should be re-evaluated even at the varietal level. It tends to be distinguished from the rest of the Series Globulares Gale by a combination of such fruit characters as bristles overtopping ripe fruit, tubercle strongly depressed, conic-discoid, apiculate. However, a single population may vary widely even in these characters, and even a single plant may show fruit variation. Unfortunately there is sufficient overlap with other taxa such as R. oblitterata Gale, R. sulcata Gale, even R. culixa Gale of the neighboring series Harveyae to make one realize why Kükenthal made these varieties, the first two of R. globularis, the latter one of R. grayii.

Habitat and Management Implication:

R. globularis saxicola grows on and around outcrops of granite in the Georgia Piedmont, on and around the Altamaha Grit formation in the Coastal Plain of Georgia. In the former situation it is in shallow, seasonally wet depressions or along intermittent streams or seeps on and around the granites, usually in full sun and on these shallow inwash soils is in association with various grasses and sedges such as Agrostis, Dichanthelium, Panicum, Andropogon, various carices, Fimbristylis, other Rhynchospora (particularly R. globularis, R. capitellata, R. glomerata), Fuirena, Scleria, Scirpus. Other herbaceous associates include Juncus (particularly J. georgianus), Xyris, Allium, Schoenolirion croceum, Oenothera fruticosa, Rhexia mariana, R. virginica, Lindernia monticola, various composites, particularly Senecio tomentosus, etc. In the Altamaha Grit country the number and variety of grasses and sedges increases, but the character of the total herb assemblage is not much changed, except to add some of the endemics of the grit, particularly Penstemon dissectus, Bigelowia nuttallii, Marshallia ramosa and the shrubby Hypericum lloydii. The forest surrounding and invading the granites is mostly upland oak and pine, the oaks mostly Q. montana, Q. velutina, Q. nigra, Q. rubra, Q. coccinea, Q. marilandica and the otherwise rare Q. georgiana, the pines usually P. taeda, P. echinata, sometimes P. virginiana. Pignut Hickory is frequent as are White and Sand Hickory, Persimmon, Winged Elm, Sassafras, Black Gum, Black Cherry. The understory has an abundance of Cornus florida, Cercis, various Rhus, particularly R. copallina, Chionanthus, Vaccinium arboreum, with blackberry, Poison Oak, and lowbush blueberries abundant in the shrub layer. Smilax, Gelsemium, Anisostichus and Poison Ivy are common vines, together with masses of invading Lonicera. In the Grit country Longleaf Pine is the common pine, while Q. marilandica, Q. margaretta, Q. stellata and Q. laevis become the common oaks. Aristida stricta and other 3-awns, a greater variety of Andropogon, Panicum and cyperaceous plants shows up, but the floristic affinity to granite glades is plain.

Threats to this beakrush are multiple. The granites are quarried, which destroys the sites. In park areas (such as Mount Arabia) hikers and sightseers trample the shallow pools and streambanks. Many outcrops contiguous to areas of high population such as Atlanta are being subdivided for residential lots. Other outcrops have become low grade pasture and the sedges suffer from trampling and grazing. In the grit areas the same problems exist, but also the shallow soil cover, if fairly level, is now often planted to Slash pine or other pine, this leading ultimately to a shading out of sun plants such as this one.

References:

- Gale, Shirley. 1944. Rhynchospora, sect. Eurhynchospora, in Canada, the United States and the West Indies. Contribs. Gray Herb CLI.
- Kukenthal, Georg. 1954. Vorarbeiten zu einer monographie der Rhynchosporideae. Botanische Jahrb. 75 Band. Heft 2: 156-168.

SPECIES: Rhynchospora globularis (Chapm.) Small var. saxicola (Small) Kukenth.

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy							X	
Damage		NA	NA	NA				X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Do not drain!

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Known Range of:

Rhynchospora globularis (Chapm.) Small
var. saxicola (Small) Kukenthal



CYPERACEAE

Rhynchospora punctata Ell.

Status: Threatened

Technical Description:

Tufted perennial sedge, between 7 and 10 dm tall, perennating by lateral offshoots from a diffuse-fibrous-rooted stock.

Culms: erect or leaning, fairly rigid but wand-like, pale green, triangular, smooth, each edge a rounded nerve, the flattish or slightly concave intervals finely grooved and nerved, the nodes slightly contracted.

Leaves: a few widely spaced on mid and upper culm, mostly crowded toward the base, there largest save for some scale-like outer ones or fibrous remnants of dead ones, the sheaths ca. 1/5 the total leaf length, closed, the backs rounded below, sometimes strongly keeled distally, multiribbed, the ventral side scarious, at apex by junction with blade, thin, strongly concave, the blades 1.0-2.5 dm long, proximally and distally often keeled, otherwise flat, narrowly linear, 3-6 mm wide, narrowing gradually above mid-blade, then abruptly to a blunt-acute, scabrid apex, the margin narrow but thickened and white, minutely scabrid, the surface save for the midnerve pale green, finely ribbed.

Inflorescence: spikelets lance-ovoid, narrowly acute, ca. 5 mm long, a rich, glossy reddish-brown, 4-flowered, usually 2-fruited, usually few/cymule, the cymules loosely turbinate, few to several per complex on ascending to erect, unequal branches, about 3 decompound complexes lateral to main axis, and 1 terminal, on ascending or slightly spreading slender peduncles, each peduncle subtended by a bracteal leaf similar to foliage leaf but small, shorter, somewhat narrower, the lowest bracteal leaf much shorter than the peduncle, the uppermost one longer, each primary peduncle terminating in 2-3 green, linear, subulate involucre bracts subtending unequal secondary peduncles, each of these with a basal chaffy bract and enveloped by a chaffy, tubular prophyll; scales of spikelet fairly tightly imbricate, the lowest empty, smaller than the fertile, strongly cuspidate, the fertile scales broadly ovate, ca. 4.0-4.5 mm long, thin, the margins pale, the apex narrowly rounded, the backs rounded with only the mid-nerve evident, this departing subapically to form a short, minutely scabrid bristle; upper scales empty.

Florets: perianth bristles 6, antrorsely barbellate, extending at least to base of tubercle of ripe fruit and often to its tip; stamens 3, filaments flat, the short-linear anthers basifixed; style slenderly linear, cleft to about its middle.

Fruit: akene including tubercle ca. 2.5 mm long, obovoid or ellipsoidal, evidently dorsiventrally flattened (in plane parallel with plane of bracts), body transversely wavy-rugose with many, sometimes anastomosing, ridges, the intervals sharply and concavely alveolate, the alveolae rectangular and vertical, the surface reddish-brown, dullish; tubercle conic-triangular, ca. 0.4-0.5 mm long the sides straight, the base scarcely flanged, not buttressed, slightly decurrent on the upper akene edge, the apex either acute or acute-

apiculate.

Distribution and Flowering Season:

Wet acid pine flatwoods and savanna, southern Georgia and northern Florida; flowering and fruiting from late May into early July.

Special Identifying Features:

R. punctata is in the Series Globulares Gale, distinguished from other complexes by its rectangular-alveolate fruit surfaces which are also transversely rugose, as well as by the fairly rigid habit, the development of lateral and terminal decompound clusters of cymules, the presence of usually 6 perianth bristles and a conic, depressed conic, or short-subulate, grayish tubercle. Within the Globulares, the tall and firm culms, broadish and firm leaves, and particularly the very flattened and rugulose fruit, place R. punctata close to R. compressa Carey ex Chapm. In fact, the only way to tell the two apart is by fruit. The perianth bristles of R. punctata are longer, reaching at least to the tubercle base and often to its tip (rather than extending only to about the upper 1/3 of the akene as in R. compressa!), while the tubercle itself is straight-sided, apiculate (rather than concave-sided, acuminate as in R. compressa), its base scarcely flaring or flanged, and with sides slightly decurrent (rather than strongly flaring-flanged and not at all decurrent-sided as in R. compressa).

Habitat and Management Implication:

R. punctata is rare and local in the Longleaf Pine-Gallberry-Saw Palmetto flatwoods of southern Georgia and (according to old records) northern Florida. In the past it was doubtlessly maintained in grass-sedge clearings created by natural woods fires. Associate species include many lowland Andropogon, Panicum, Erianthus, Manisuris, Paspalum, Aristida, Carex, Fimbristylis (particularly F. puberula) Rhynchospora (among which are the similar R. compressa, R. globularis, which may account for this plant being overlooked!), Aletris, Eriocaulon, Lachnocaulon, Xyris (many species), Hypoxis, Lachnanthes, Lilium catesbaei, Tofieldia, Zygadenus, Sarracenia (particularly S. minor, S. flava), Rhexia, Ludwigia, lowland asclepiads, Lobelia, Polygala, and many composites. This showy community develops only on high hydroperic soils and in full sun.

Risks to this species in its few known localities include (1.) fire protection which allows woody vegetation to invade open areas, (2.) drainage ditching precursory to mechanical site preparation or logging of wet pinelands, which dries out the habitat as well as destroys the bog soils, or (3.) clearing for the purpose of development of improved pasture, in which case even without drainage the aggressive introduced Paspalum or Cynodon crowd out native grasses and forbs. Large tracts are also being drained, cleared, and prepared for row crops, and thus more habitat is lost.

References:

Gale, Shirley. 1944. Rhynchospora, sect. Eurhynchospora, in Canada, the United States and the West Indies. Contr. Gray Herb. CLL.

SPECIES: Rhynchospora punctata Ell.

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X		X			X	
Damage			X					X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Drainage ditching destroys the habitat !

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Rhynchospora punctata Elliott



ERICACEAE

Rhododendron bakeri (Lemmon & McKay) Hume

Azalea bakeri Lemmon & McKay

Rhododendron cumberlandensis E.L. Braun

Status: Threatened

Technical Description:

Compact deciduous shrub, rarely exceeding 2 meters, the primary shoots few-to-numerous, erect or ascending, the lower bark thin, with long, longitudinal shallow cracks, forming a pattern of narrowly rectangular platelets, these shoots rebranching to form a broad crown, the rootstock shallow, spreading-diffuse.

Twigs: New shoots of a season as in most Rhododendron, namely slender, straight, mostly subwhorled, with the nodes distant toward shoot base, close toward shoot apex, the surface pale reddish-brown or greenish-brown, from nearly smooth to sparsely puberulent or moderately puberulent with some stouter, longer hairs admixed, but no hairs glandular; older shoots becoming gray-brown, or ash gray, smooth. Winter inflorescence buds ovoid, acute, the imbricate bud scales mostly ovate, acute to rounded, often cuspidate, the backs chestnut-brown to reddish-brown, nearly smooth to appressed-white-puberulent, the thin margins pale, ciliolate.

Leaves: alternate-spiral as in other Rhododendron, mostly spreading to ascending, hardened before flower buds open, prevalently oblanceolate to elliptic or narrowly obovate, acute and mucronate, entire to minutely serrulate, strigo-ciliate, on short, nearly smooth to puberulent, also sometimes sparsely hirtellous, e-glandular petioles mostly 2-4 mm long, the blade surfaces above nearly smooth or sparsely incurved-strigo-puberulent, particularly toward the margins, and white-tomentulose along the impressed midvein, beneath hirtellous along the strongly raised midvein, sparsely villosulous along the lateral veins, otherwise nearly smooth, and with no glandular hairs.

Inflorescence: a compact, umbel-like raceme as in many Rhododendron, the slender, straight pedicels mostly under 1 cm long, hirtellous, e-glandular, subtended by inner bud scales and narrowly linear, hairy-tipped scales.

Flowers: bisexual, the corolla very slightly zygomorphic the calyx regular; sepals 5, low-triangular, somewhat scale-like, ca. 1.5 mm long, hirsute-ciliate, the backs sparsely to densely appressed-hirtellous; the petals 5, fused into a tube ca. 2 cm long, this expanding funnelform, the lobes obliquely spreading, lance-oblong or narrowly ovate, acute, short-acuminate, the upper lobe broadest, the whole limb 4-5 cm across; external surface with tube and throat pilosulous, also sparsely short-hirsute with these hairs gland-tipped, the lobes sparsely puberulent with some hairs gland-tipped; color ranging from near yellow through pale to deep orange, deep

orange red or brick red, usually with the upper (broadest) lobe bearing a strong yellow splotch medially toward base inside.

Fruit: Capsule cylindrical or lance-cylindric, ca. 2 cm long, strigillose, with no glandular hairs, opening from narrowed apex downward septicidally, the numerous wedge-shaped small seeds with axile placentation.

Distribution and Flowering Season:

Sands and sandy loams, open, moistish to dry woodlands, Cumberland Mountains, Cumberland Plateau, West Virginia and southwest Virginia southward through Kentucky and Tennessee east of the Blue Ridge and local in Valley and Ridge; flowering mostly from early June into July depending on altitude or latitude.

Special Identifying Features:

Of the reddish-flowered azaleas this one is the most compact and with perhaps the greatest horticultural potential, so that one good feature is the low, heavily floriferous habit. Its range, flowering time and morphology overlaps most with the true Flame Azalea, R. calendulaceum, but it differs from that species in having slightly smaller flowers, the corolla tube of which has a mixture of short eglandular hairs and longer, sparse glandular hairs (in R. calendulaceum the hairs are longer, often denser, with more and longer gland-tipped ones), the stamens with filaments smooth or sparsely hairy only toward base (in R. calendulaceum hairs extend at least midway up the filaments). R. bakeri flowers expand weeks after the leaves have, while in R. calendulaceum the leaves and flowers expand together. Single populations of each often run the gamut from yellow to red, though R. bakeri tends more toward deep reds than does R. calendulaceum, and may be uniformly red. As Dr. Braun (1941) has commented, there are intergradations between the two species along the contact in the eastern Cumberlands and in the Valley and Ridge, but if degree of hybridization effected the taxonomy toward reducing hybridizing species there would be few azaleas in the southeastern flora.

Habitat and Management Implication:

This azalea is a plant of uplands, from moist to rather dry sandy loams in open woodlands whose overstory is made up mostly of oak-hickory-pine. It may share the understory with Kalmia, other Rhododendron, Oxydendrum, Leucothoe, etc. as part of a heath cover, or may be the only heath present. In areas I have seen in the Tennessee and Virginia Cumberlands it seems to persist well in woodlands that have been heavily cut over, in some cases clearcut or even burned, but is eliminated where most methods of

mechanical site preparation have been employed. I have not seen it as understory to plantation of, or dense stockings of Shortleaf, Loblolly, or Virginia Pine. It is poisonous to livestock, though it may be used by deer. Apart from the threat it faces through wholesale blocks of land undergoing or having undergone site preparation it, because of the very showiness of the shrub, is much endangered by vandals and shrub diggers. Also, much of its heart range has been ravaged by strip mining.

References:

- Braun, E.L. 1941. The red azalea of the Cumberlands. *Rhodora* 43: 31-35.
- Lemmon, W.P. 1937. Notes on a study of the southeastern azaleas with descriptions of two new species. *Bartonia* 19: 14-17.
- Fernald, M.L. 1950. Gray's manual of botany, ed. 8, Rhododendron, pp. 1116-1120.

SPECIES: Rhododendron bakeri (Lemmon & McKay) Hume

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X		X			X	
Damage			X			X		
No Lasting Effect	X							X
Beneficial if Done Properly					X			

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Range of:

Rhododendron bakeri (Lemmon & McKay) Hume



EUPHORBIACEAE

Euphorbia exserta (Small) Coker

?Tithymalopsis gracilis (Ell.) Small

T. exserta Small

E. gracilior Cronq.

Status: Threatened

Technical Description:

Milky-juiced, smooth, slender-and-divaricately-branched perennial from a deep-set, fleshy, simple or branched, vertically oriented rootstock, the stems usually several, arising at or well below the groundline from alternate or clustered buds.

Stems: arising from or well below the ground line, mostly 3-5 dm high, underground portions slender, much branched, the leaves short, scale-like; aerial branches several to many (imparting a tufted look, the primary branches often resembling individual plants), erect or ascending, repeatedly branching, usually forking either from near the ground line up, or well above the ground line, bearing a broad, low, split gland in the crotches, slender, terete, smooth, pale to deep green, usually strongly tinged with maroon, the ultimate branches becoming nearly filiform, forming a round, delicately branched crown.

Leaves: sometimes alternate, usually opposite, the lower ones often absent by anthesis, but when present highly variable in outline, in the axil either bearing a cleft gland or a branch, the stipules reduced to minute, reddish glands, the petiole short (under 3 mm) or absent, the larger blades lowest, from filiform (rarely) to linear, oblanceolate, spatulate, obovate, suborbicular or even reniform, 1.5-5.0 cm long, apically narrowly to broadly rounded, the margin thickened, entire, usually reddish, the base acute to short-attenuate or rounded or truncate, the surface gray-green or tinged with maroon. Leaf blades progressively reduced in size, narrowing, up the stem, those of a pair sessile, often unequal, ultimately those of upper branches short-linear, 5 mm or less long, or in some cases simply narrower in outline and not much reduced in length.

Inflorescence: much branched, the numerous peduncles arising at branchlet tips or from branch axils, filiform, often maroon, mostly several to many times longer than the involucre (cyathia). Cyathia campanulate, ca. 2.5 mm high, deep maroon, bearing at the margin of the cup 5, losenge-shaped glands, each gland marginally producing a narrow, broadly rounded or truncated petaloid appendage.

Flowers: unisexual, each cyathium producing several male florets each having but 1 stamen and a single female floret, the perianth in either case vestigial, in the male each filament jointed to a stalk, the ripe round anther sacs elevated to or slightly above the cyathial rim, the female floret similarly raised on a stalk (gynophore) to slightly above the rim and evident only as a 3-lobed, rounded, maroon ovary, this with 3 short styles, each rebranched to form short-lineal stigma branches.

Fruit: Capsule at maturity strongly exserted beyond the rim of the cyathium on a filiform stalk (lengthened pedicel and gynophore) several times the height of the cyathium, nearly round in outline and strongly 3-lobed, about 3 mm high, 3-loculed, 3-valved, smooth, usually reddish, producing 1 seed/locule; seeds ca. 2 mm long, broadly obovoid, the small caruncle on the inside base, the broadly rounded back with a low, longitudinal ridge, the seed faces smooth, sometimes with a few low concavities, grayish or pale grayish-brown.

Distribution and Flowering Season:

Sandhills in Longleaf pineland, Coastal Plain, eastern North Carolina southward to northern Florida, westward to southwest Georgia and northwest Florida; flowering from May to early August.

Special Identifying Features:

This species is well marked by a combination of slender, though stiffish, divaricately branching habit, its strong reddish pigmentation of cyathial cups, fruit, even peduncles and branches, the short-petioled or sessile variable leaf blades, these often maroon-margined. The capsule is smaller, the seed smaller than those of E. ipepacuanhae, which has larger cyathia and whose stems and branches, while slender, are not as delicate.

Habitat and Management Implication:

E. exserta is a plant of deep dryish sands and appears to be an integral part, if infrequent, of the Longleaf Pine-deciduous scrub oak sandhills. The most constant overstory species then are Longleaf Pine, Quercus laevis, Q. margaretta, Q. incana, Q. marilandica, Q. stellata, Q. geminata (to the south in the range), Carya glabra, C. tomentosa, C. pallida. Understory trees and shrubs may be Cornus florida, Diospyros, Sassafras, many ericads, particularly Vaccinium, Gaylussacia, Lyonia mariana, etc. To the south in the range Osmanthus, Symplocos, Ceratiola, various shrubby Calamintha, Conradina may enter this type, as does Saw Palmetto. Herbaceous associates include several Aristida, Sporobolus, Andropogon, Triplasis, Cenchrus, Eragrostis, dichanthelium Panicum, Cyperus (particularly C. retrorsus, C. filiculmis), Rhynchospora such as R. grayi, R. megalocarpa, Bulbostylis, Paronychia, Lechea, various legumes such as Lespedeza, Desmodium, Stylosanthes, Psoralea canescens, Cassia, Indigofera, Lupinus, Petalostemon carolinianum, Warea, Opuntia, Dicerandra, many Asclepias, and an abundance of composites, all species typical of deep sand formations, many cormophytes and all adapted to frequent natural woods fires which reduce woody competition and often present a landscape that has large open stretches of loose sand. In fact, the way to perpetuate a species such as E. exserta is to apply fire as a management tool as has been done in this forest type. The problem becomes more difficult when any mechanical site preparatory work is done. This species, as do many other such herbs, readily occupies disturbed open sandy areas and may thrive during the earlier years of the plantation. However, it disappears as soon as the crowns close, reappearing only years later as, through thinnings,

the stand reopens.

References:

Coker, W.C. 1912. Euphorbia exserta in Plant life of Hartsville: 88.

Cronquist, Arthur. 1949. Euphorbia gracilior in Castanea 14: 102.

Radford, A.E., H.E. Ahles & C. Ritchie Bell. 1968. Manual of the vascular flora of the Carolinas, pp. 668-674.

Small, J.K. 1933. Manual of the southeastern flora, pp. 788-800.

SPECIES: Euphorbia exserta (Small) Coker

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy							X	
Damage			NA					
No Lasting Effect		X		X				X
Beneficial if Done Properly	X				X	X		

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Euphorbia exserta (Small) Coker



FABACEAE

Baptisia hirsuta Small

Status: Threatened

Technical Description:

Bushy perennial mostly 3-8 dm high from a large, knotty, often irregularly roundish or short-cylindric crown, this with thick, very deep roots, perennating by means of crown buds.

Stems: stiffly erect or ascending, 1-several per crown, regularly ascending-branched, usually from near the base and prolifically rebranching to produce a broadly rounded or oval crown; lower part of stem stoutish, to 1 cm thick, tapering regularly upward, the branchlets proportionately more slender, stem and branches terete, low-ribbed, greenish-yellow or greenish-brown, villous-hirsute or even shaggy tomentose with white hairs.

Leaves: alternate, stipulate, the lowermost on approximate nodes, scale-like, the largest (along main stem) with paired, foliaceous elliptic to oblanceolate or lanceolate, acute, entire stipule blades 1.0-1.5 cm long, the leaves palmately trifoliate, the petiole mostly 3-5 mm long, the leaflets spreading, obovate to oblanceolate, subequal, 1-3 cm long, rounded to acute or obtuseangled, often mucronulate, entire, the base broadly to narrowly cuneate, on short, villous petiolules, a pale dull green, the surfaces at first white-villous-hairy, villous-ciliate, later becoming smoother save on veins and margins; upper stem and branch leaves (bracts) becoming simple, elliptic, oblong or broadly lanceolate, similar in color and hair to lower leaves, the lowermost as long as leaflets of larger leaves, but progressively reduced in size toward branch tips,

Inflorescence: a leafy-bracted raceme, the pedicels slender, reddish, shaggy-white-villous, widely ascending from all or nearly all leaf axils of branchlets, and each bi-bracteate above the middle, in length from several times to slightly longer than the flowers, the longest ones lowest on the branchlet.

Flowers: bisexual, irregular, spreading, the calyx of 5 subequal sepals, fused at base into a broadly campanulate, shaggy-white-pilose tube 4-5 mm high, the lobes elliptic or broadly oblanceolate, about 1 cm long, erect, acute, pilose-ciliate, colored like leaves and scattered-pilose, overtopping the petals; petals 5, the corolla papilionaceous, the petals distinct, pale yellow, the banner ca. 8 mm long, short-stalked, broadly obovate or broader than long, retuse, folded along the midnerve and projecting forward in the flower, the wing (lateral) petals with flat claws ca. 3.5 mm long, the oblong-lanceolate, rounded-tipped blades pointing forward, flat, ca. 9 mm long, the base auriculate, the larger auricle dorsal (uppermost), the keel petals slightly longer, the flat claw equal in length to that of the wings, the blade oblong-obovate, broadly rounded-tipped, bearing a prominent basal reflexed auricle dorsally at base, the lower edge more strongly curved than the upper; stamens 10, distinct, all pointing forward around the ovary, subequal, ca. 1 cm long, the filaments pale, slender, terete, tapering at tip to pale yellow, dorsifixed, ellipsoidal anthers; ovary superior, stipitate, the body fusiform, ca. 3 mm long, tapering into a slenderly linear,

abruptly upswept stylar apex, this tipped with a short stigma, the stylar surface pilose from base to ca. 2-3 mm below the stigma. Fruit: legume somewhat woody, brown, on a stipe 4-5 mm long, the broadly ovoid or ellipsoidal body ca. 1 cm long, scattered pilose-hirsute, more densely hairy along the margined valve edges, abruptly narrowing into the linear-subulate persistent style base; seeds few, oblong-ellipsoidal, laterally somewhat flattened, ca. 3 mm long, smooth, olivaceous.

Distribution and Flowering Season:

Sands of Longleaf Pine-deciduous scrub oak woodlands, northwestern Florida; flowering mostly in May.

Special Identifying Features:

The most distinctive character held by this Wild Indigo is its very leaflike calyx lobes which at anthesis project forward, largely concealing the yellow petals, actually overtopping them. There is but one other species in the southeast which has that calyx feature, namely B. calycosa Canby, an endemic of northeastern peninsular Florida in the St. Johns River drainage in sandy pine flatwoods savanna. However, that species is glabrous, whilst this one is very pubescent, its pale villosity in the field giving the foliage a distinctive grayish aspect.

Habitat and Management Implication:

B. hirsuta decorates the deep yellow sands of Longleaf Pine-Turkey Oak sandhills and flats mostly between Defuniak Springs and Crestview in panhandle Florida, its small round crowns of gray - green foliage distinctive even at a distance. The original pine has long ago been mostly logged out, the stocking now is poor and of low quality so that most of the area has gone over to open or rather dense stands of scrub oak dominated by Q. laevis, but with liberal representation of Q. incana, Q. margaretta, Q. geminata. Where the oak and associated scrubland hardwoods are densest the Baptisia is scarce or absent. Where, through fire, logging disturbance or other wood cutting, the woods have been opened up, or where powerlines or rights of way for railroad and highway have been created, the Baptisia is most abundant, there associated with such sandscrub herbs as ARistida, Sporobolus, Eragrostis, Panicum, Andropogon, Cyperus (particularly C. filiculmis), Bulbostylis ciliatifolia, B. warei, Yucca, Commelina erecta, Tradescantia hirsuticaulis, Stipulicida, Paronychia, various Euphorbia, Polygala polygama, Lechea, Oenothera fruticosa, Opuntia, many legumes, particularly Desmodium, Lespedeza, Psoralea canescens, Indigofera caroliniana, Lupinus diffusus, L. villosa, L. nuttallii, Phlox nivalis, Onosmodium virginianum, Lithospermum carolinense, Ruellia, Dyschoriste oblongifolius, and many more, including very many Asteraceae, particularly (during the flowering time of the Baptisia) Silphium, Phoebanthus tenuifolia, Berlandiera pumila, Erigeron strigosus, Tetragonatheca helianthoides, Hymenopappus scabiaeosus, etc. Low, clonalizing shrubs such as Chrysobalanus oblongifolius, Rhus toxicodendron, Gaylussacia dumosa and running oaks are common.

This sort of habitat, once the original pine had been removed,

languished until after World War II, after which increasingly large acerages were converted to plantation pine or to varied (some abortive) real estate ventures. In the case of pine plantings, large acerages are site prepared mechanically. Such plants as the Baptisia will readily move into the disturbed areas, providing seeding plants are left in adjacent area. However, they are shaded out as the growing crowns of the young pines close over.

References:

- Lairsey, Maxine. 1940. A monograph of the genus Baptisia.
Ann. Mo. Bot. Gard. 27: 119-242.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 674-678.

SPECIES: Baptisia hirsuta Small

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy							X	
Damage								X
No Lasting Effect		X		X				
Beneficial if Done Properly	X				X	X		

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Known Distribution of:

Baptisia hirsuta Small



FABACEAE

Petalostemon gattingeri Heller

Status: Threatened?

Technical Description:

Perennial from a stout, knotty caudex, this with a deep woody taproot or with several stout-based, elongate, spreading roots, and developing a crown of several woody branches at the groundline.

Stems: mostly spreading, or slightly ascending, simple to copiously branched, the older plants forming a circular mat of many shoots, these slender but stiffish, terete or rib-angled, pale green or sometimes with tints of purple, mostly 2-5 dm long, smooth or with some villous-puberulence distally.

Leaves: alternate, mostly 2-4 cm long, numerous, stipulate, the stipules narrowly triangular or linear-subulate, thin, tan, the petiole (rachis) spreading or ascending, slender, greenish, grooved above, sparsely pilosulous, gland-dotted; leaflets odd-pinnately compound, in (1-) 2-4 pairs, linear, oblong-linear or elliptic-linear, mostly (-.5) 1.0-1.5 (-2.0) cm long, 1-2 (-3) mm wide, apically rounded, acute or retuse, the margin revolute, the base abruptly acute to a petiolule less than 1 mm long, the surfaces pale yellow or gray-green, sparsely pilosulous, the upper side dotted with dark glands, the venation evident only as a single mid-nerve.

Inflorescence: terminal on main axis and branches, densely floriferous, a tight, cylindrical indeterminate spike (2-) 3-6 (-8) cm long, ca. 1 cm thick, the axis villous-tomentulose, the individual flowers subtended by chaffy, tomentose-backed bracts with ovate bodies and exserted, linear-subulate tips (or rarely these bracts replaced by large glistening black glands).

Flowers: perfect, bisexual, irregular, spreading; calyx obovoid to ellipsoidal, 4-5 mm long, the 5 sepals united to form an inequilaterally campanulate tube ca. 2.0-2.5 mm long, the limb slightly bilabiate, the upper lip of 2, triangular-subulate teeth, the lower of 3 narrowly triangular-subulate teeth, all projecting forward and slightly upswept from the oblique orifice, the surface pale green, cloaked with a white to silvery villosulous tomentum; petals mostly 5 (to 2 or 1), strongly clawed, projecting forward, ca. 4.0-4.5 mm long, arising alternately with stamens on stamen tube, a lively bright rose, the standard longest, largest, its blade mostly broadly oblong to ovate or ellipsoidal, symmetrical, the wing and keel blades inequilaterally oblong, slightly shorter and narrower; stamens 5, united, the filaments joined into a ligule, ca. 3.0-3.5 mm long, the free portion pinkish, terete, often flexuous, ca. 3 mm long, exserted beyond the calyx tips, the short-oblong or ellipsoidal anthers dark purple, dorsifixed ca. 1 mm long, the pollen white; ovary superior, sericeous, 1-ovulate, the style produced apically from dorsal side, slender, linear, terete, pinkish, gradually narrowing into a short, whitish, terminal stigma.

Fruit: legume 1-seeded, inequilaterally oblong, ca. 3-4 mm long, the upper side straight and continuous with the persistent style beak, the lower side strongly curved, the body externally scattered with gland dots, toward narrowed base nearly smooth, toward stylar

end white-strigose-tomentose; seed ca. 1.5 mm long, the coat smooth, brown.

Distribution and Flowering Season:

Limestone glades and barrens, middle Tennessee, northwestern Georgia and northern Alabama; flowering from mid-May through June.

Special Identifying Features:

P. gattingeri overlaps in range with but 3 other Petalostemon, namely P. foliosus, P. candidus, and P. purpureus. Of these P. foliosus has many more pairs of leaflets, is a taller, more erect plant, more bluish-tinted in petal color, has a smooth calyx tube and begins to flower when most P. gattingeri is in fruit; P. candidus is a taller plant with broader, smoother leaflets, a smooth calyx tube, and white petals. This leaves P. purpureus, a widespread polymorphic species of prairies and glades north west and south, with which P. gattingeri may hybridize. This species however, while it does have similar flower color, a hairy calyx tube, similar fruit and leaflets, is a taller plant tending to be more erect in habit, thus often not forming the cushionlike mats that are so typical of P. gattingeri. P. purpureus tends to have a more densely floriferous, shorter spike, narrower bract bodies that tend to be more acuminate-tipped than cuspidate (as is the common case with P. gattingeri). Pubescence of calyx is more appressed in P. purpureus than it is in P. gattingeri.

Habitat and Management Implications:

P. gattingeri is one of the more common limestone glade perennials in middle Tennessee and northern Alabama on limestone outcrops. It represents the perennial herbaceous stage of colonization of open glades, its long roots penetrating deeply into cracks in the limestone or into the heavy clay soils derived therefrom. Common herbaceous associates are Sporobolus, Melica, Panicum, Bouteloua, Tridens, Allium, Juncus, Carex, Arenaria, Talinum, Arabis, Leavenworthia, Lesquerella, Sedum pulchellum, Delphinium virescens, Astagalus tennesseensis, Psoralea subcaulis, Onosmodium molle, Lithospermum canescens, Oenothera triloba, Scutellaria parvula, Penstemon tenuiflorus, P. calycosus, and many composites, in total presenting a very showy sight. Over most of the range of this vegetational type, the successional pattern is for occupancy of open glades by shrubs such as Symphoricarpos, Rhus aromatica, Rhamnus, Forestiera, etc., trees such as Juniperus, Ulmus, Celtis, Quercus, Carya, Fraxinus, Diospyros, etc. which ultimately close the open areas and suppress the herbs. Removal of tree cover through fire (the historical process) or cutting would probably tend to favor increase of this species, providing there were contiguous seed sources.

P. gattingeri moves more readily than most other glade endemics; for example, it is coming in strongly along most new highway rights-of-way through limestone barrens, being better adapted than most because of its prostrate-stemmed habit which allows it to escape

most mowing equipment. On the other hand it fares less well if a glade is converted to pasture, in that the plants suffer from grazing and trampling.

References:

Small, J.K. 1933. Manual of the southeastern flora, pp. 695-697.

Wemple, Don K. 1970. Revision of the genus Petalostemon (Leguminosae).
Iowa State Journ. Sci. 45: 1-102.

SPECIES: Petalostemon gattingeri Heller

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		NA	NA	NA			NA	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	x				X	X		

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Distribution of:

Petalostemon gattingeri Heller



FABACEAE

Psoralea subacaulis T. & G.

Pedimelium subacaulis (T. & G.) Rydb.

Status: Threatened?

Technical Description:

Perennial, rosulate, the rosettes terminal to slender, erect or ascending, pale, scaly underground stems, these arising singly or severally from the crown of a deepset, simple or branched carrot or turnip-shaped tuberous rootstock.

Leaves: alternate, of 2 sorts, one scalelike on the underground stem and in the rosette and probably modified stipule, those of the underground stem erect, with strongly clasping base, oblong or triangular, brownish, those in the rosette somewhat larger, paler, broader, usually imbricated, apically acute or bifid, the backs sparsely stigose-hirsute, the margins distally densely and coarsely long-white-ciliate; foliage leaves palmately compound, numerous and in a strong sub-rosette, with petiole bases directly subtended by and hidden within the scale-like stipules, the petiole ascending or spreading, slender, teretish, ribbed, pale green with purple tints, white-hirsute, 6-15 cm long, the leaflets mostly 5-7, spreading on stubby petiolules not longer than 2 mm, mostly oblanceolate, 2.0-3.5 cm long, apically broadly to narrowly rounded or obtuseangled, often mucronulate or apiculate, the margin hirsute or strigo-ciliate, the base narrowly cuneate, the upper surface dark or pale yellow-green, scattered strigose-hirsute, dotted with fine dark glands, the lower surface again gland-dotted, somewhat paler, smooth or scattered-hirsute, the strongly raised midvein hirsute.

Inflorescence: spikelike, erect, terminal, indeterminate, at first compact, 3-4 cm long, 2-3 cm broad, later somewhat interrupted and to 10 cm long, on slender, spreading to erect, terete, white-tomentose-hirsute peduncles about as long as the petioles or slightly longer, the numerous flowers mostly overlapping in several sessile 3-flowered cymules, each cymule subtended by a scarious, scale-like, ovate, purplish, hirsute-ciliate bract 5-10 mm long, the pedicels of a cymule subequal, stoutish, strigo-tomentose, purple, rarely longer than 2 mm.

Flowers: bisexual, zygomorphic, the calyx at anthesis 9-10 mm long, gamosepalous, the tube asymmetrically campanulate, bulging slightly above at base, the orifice oblique, the lobes erect, hirsute-ciliate, the upper 2 lobes and the 2 laterals subequal, triangular, 1.5-2.0 mm long, acute, the sinuses rounded, the lowest lobe largest, elliptic or obovate, ca. 4 mm long, apically obtuseangled or rounded, the surface hirsute, purplish, particularly distally; petals 5, papilionaceous, bright blue-purple, the banner petal 16-20 mm long, with the claw usually ca. 3 mm long, the blade oblong, apically rounded or retuse, strongly folded, projecting forward and slightly upcurved, the wings slightly shorter, similarly projecting forward and slightly upcurved, the more narrowly oblong blades ca. 9-10 mm long, bearing on the upper side basally a strong auricle, the

keel petals ca. 2 mm shorter than the wings, with claws about 6 mm long and blades asymmetrically oblong, rounded, each with a strong auricle at upper side of base; stamens 10, smooth, diadelphous, ca. 10 mm long, the upper (vexillary) one free, the others united most of the filament length, the anthers yellow, ellipsoidal, basifixed, ca. 0.5 mm long; ovary superior, strigose, the slender style scattered-strigose proximally, distally bent upward near level of anthers, there somewhat thickened, the stigma narrowly capitate.

Fruit: legume ca. 1 cm long, somewhat compressed laterally, elliptical, strongly tapered at both ends, strigose-hirsute with white hairs; seeds usually 1, reniform, somewhat compressed laterally, 4.5-5.0 mm long, smooth, dark brown.

Distribution and Flowering Season:

Open limestone glades, calcareous clay clearings and open rocky woods, local but often aspect dominant, northwestern Georgia (Catoosa Co.) and adjacent Tennessee, mostly in limestone districts of middle Tennessee (the Nashville Basin); northern Alabama; flowering from early April to mid-May, dying back by late June.

Special Identifying Features:

There is no other Scurf-pea within the range of P. subacaulis that remotely looks like this showy plant that actually to the novice botanist appears to be a lupine. Closest to it are "Pediomelum" psoraleas such as P. esculenta Pursh (Bread-root) and P. cuspidata which inhabit calcareous prairies and glades in prairie provinces west of the Mississippi and which have similar turnip-like rootstocks. The former is so similar, being villous-hirsute, with similar habit, flowers and leaves, that it might be considered a vicarious taxon representing western populations of a single species, the now isolated eastern populations radiating to what is now P. subacaulis.

Habitat and Management Implication:

Like so many other endemics of limestone glades in the mid-South, this species should be considered forest related only in the successional sense. Origin of these limestone glades is perhaps still argued, but certainly development and continuance have to do with a combination of shallow parent rock material of flat-bedded or slightly sloping limestone together with fire during dry cycles, this last reducing or halting succession of woody plants. The assemblage of herbaceous associates gives a prairie-like aspect, with the Psoralea often being a dominant and showy feature, interspersed with other endemics such as Petalostemon gattingeri, Onosmodium molle, Viola egglesonii, Lobelia gattingeri, several Leavenworthia, Lesquerella, with other herbs such as Arenaria patula, Sedum pulchellum, Ranunculus fascicularis, R. sardous, Delphinium virescens, numerous carices and grasses, Oenothera triloba, Lithospermum canescens, Scutellaria parvula, Verbena canadensis. Opuntia compressa and Agave virginica are frequent, as are several composites, notably Senecio anonymos, S. obovatus, Coreopsis lanceolata, Crepis pulchra, etc.

The Psoralea develops where the clay has developed to some depth or accumulated as inwash in cracks or depressions in the limestone, and may form patches of thousands of plants. It gives way as woody plants invade and shade it out. Usually this invasion is by Juniperus or the juniper together with other such trees as Quercus muhlenbergii, Q. shumardii, Q. stellata, Q. imbricaria, Carya carolinae-septentrionalis, Ulmus serotina, U. americana, U. rubra, Celtis laevigata, Sassafras, Diospyros, Fraxinus americana, F. quadrangulata, and shrubs such as Rhus aromatica, other Rhus, Rhamnus caroliniana, Symphoricarpos, Rubus. In some cases the Juniperus forms solid stands, these later to give way to a hardwood forest climax, but whatever the overstory the story is the same, and the Psoralea disappears as the shade increases. In the pre-Columbian past the story must have been one of old open glades giving way to woody vegetation, which during dry cycles probably in turn would be opened up by natural fire to create a savanna-like aspect. Fire would also sweep the open glades, thus promoting erosion of the thin, heavy soils and in places expose limestone on which the slow process of succession would begin anew. Today the Psoralea and other limestone glade endemics suffer from urban expansion of cities such as Nashville, Murphreesboro, Lebanon, or from conversion to pasture. A removal of tree cover, providing this is not accompanied by drastic soil disturbance, would tend to provide new area for the Psoralea, as would controlled burning.

References:

- Fernald, M.L. 1950. Gray's manual of botany, ed. 8, pp. 896-898.
- Small, J.K. 1913. Flora of the southeastern United States, pp. 620-623.
- _____. 1933. Manual of the southeastern flora, pp. 693-694.

***Note. For studies on strategies of Psoralea subacaulis and several other limestone glade endemics one should consult the works of Dr. Elsie Quarterman, Dr. Jerry Baskin, Dr. Carol Caudle where much pertinent ecological information is given.

SPECIES: Psoralea subacaulis T. & G.

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		NA	NA	NA			NA	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Distribution of:

Psoralea subacaulis T. & G.



THE UNITED STATES OF AMERICA

1952-1953

THE UNITED STATES OF AMERICA

1952-1953

ASTERACEAE

Coreopsis pulchra F. Boynton in Small

Status: Threatened

Technical Description:

Caespitose, smoothish, perennial sunflower, the few-to-several stems each arising from a fleshy, stout-linear, ascending rhizome to 1 cm thick, the rhizomes often radiating from a parent plant.

Stems: rarely erect, usually decumbent-based or spreading outward from the center of a clump, mostly unbranched below the inflorescence, mostly 3-7 (-10) dm long, terete, with many low ribs, slender but stiffish, pale yellow-green or with red or maroon-tinted ribs, strongly leafy with many short internodes, the shortest at stem base, the nodes sometimes sparingly spicular-hairy, the lowermost leafless by flowering time.

Leaves: opposite, the smallest lowermost, the largest toward mid-stem, nearly sessile, ternately dissected to the very base, the primary segments narrowly lineal, flat, again divided toward base or pinnately divided near base, but the ultimate segments mostly long, linear or linear-spathulate, 1-ribbed, yellow-green, apically acute, marginally entire or slightly scabrid distally, the overall effect being one of dense leafiness, the segments because of their length and abundance appearing as verticels of linear leaves.

Inflorescence: Heads few to many in a terminal cyme or occasionally some of the lower peduncles also cymose; peduncles erect or ascending, variously elongated, naked or with a pair or more of short-linear bracts; involucre at anthesis campanulate, from base to tip of chaff 7-10 mm high, very firm, and comprised mostly of 2 series of bracts, each series joined basally into a cup (calculus), with sometimes an additional 1-2 small bractlets at very base; outer phyllaries smallest, green, erect, linear-spatulate or oblong, obtuse, entire or ciliolate, 3-4 mm long; inner phyllaries yellowish-orange, the free portions erect, oblong-ovate or triangular, the narrowed apices minutely ciliate, blunt, the margins toward base scarious; surface of receptacle chaffy with pales colored as in inner bracts, mostly narrowly spatulate-linear, to 1 cm long.

Flowers: Ray florets 7-10, sterile (sterile ovary and perianth tube after anthesis expanding, flattening and elongating to form an outer ring of chaff!), the ray corollas spreading above a short, puberulent tube, the ligules elliptic-linear, 2-3 cm long, bright yellow; disc florets very many, in mass a dark purplish-brown, the disc corollas linear-funneliform, 4-5 mm long, the 5 short, triangular lobes erect or slightly spreading, sometimes apically puberulent.

Fruit: Akene body elliptical-oblong, strongly flattened parallel to phyllaries, ca. 5 mm long, smooth, longitudinally low-ribbed, dark gray-brown, but with narrow yellow marginal bands; pappus early deciduous, highly variable in length, of 2, subulate, yellowish awns, one on either side of an apical notch in the akene.

Distribution and Flowering Season:

Sands and sandy loams in and around sandstone outcrops, northeastern Alabama and adjacent northwestern Georgia; flowering from late August through September, intermittently to frost.

Special Identifying Features:

This species most resembles C. verticillata L. or C. delphinifolia Lam., but the former, which in range extends no nearer than the Blue Ridge province of western North Carolina and the latter, primarily of Coastal Plain Georgia and South Carolina with an outlier in eastern Tennessee, both develop slender, elongate, yellowish rhizomes which are lacking in C. pulchra; both have yellowish, rather than purplish-brown, discs.

Habitat and Management Implication:

C. pulchra is either in shallow pockets of inwash soil over sandstone or on the shallow sandy soils around the outcrops. This substrate is usually in full sun, subject to great extremes of temperature and moisture. Associated herbs indicate at least seasonal dryness; *Talinum* spp., *Opuntia compressa*, *Crotonopsis*, *Panicum lithophilum*, *P. flexile*, *Deschampsia flexuosa*, *Commelina erecta*, *Agave virginica*, *Polygonum tenue*, *Liatris microcephala*, *Bigelowia nuttallii*, various other upland composites, and many outcrop lichens and bryophytes. Successional forces are toward gradual invasion of the shallow soils and outcrops first by perennial grasses and forbs, later by pine-oak-hickory with an understory of Sourwood, Mountain Laurel, Holly, Fringetree, Dogwood, Blueberry, etc., with the *Coreopsis* and other heliophytes confined to smaller and smaller clearings, finally suppressed. Openings were in nature probably maintained by periodic woods fires together with erosive forces. Danger to the species today comes from real estate development of private lands, particularly those along the streams which are highly scenic because of the ruggedness of the sandstone bluffs and outcrops. Another current danger is from wholesale denudation of some parts of this habitat by coal stripminers. It is fortunate that large stretches of bluffs and outcrops along and above the Little River in northeastern Alabama, and which support large populations of this *Coreopsis*, are a part of the Alabama State Park system.

References:

- Sherff, E.E. 1936. Revision of the genus Coreopsis. Field M.s Nat. Hist. Bot. Ser. 11: 277-475.
- Small, J.K. 1903. Flora of the southeastern United States, p. 1277.
- _____. 1933. Manual of the southeastern flora: 1446-1450.
- Smith, E.B. 1976. A biosystematic survey of Coreopsis in eastern United States and Canada. Side 6 (3): 123-215.

SPECIES: Coreopsis pulchra P. Boynton in Small

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy								
Damage		NA	NA	NA			NA	X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Range of:
Coreopsis pulchra F. Boynt.



FAGACEAE

Quercus arkansana Sargent

Q. caput-rivuli Ashe

Status: Threatened

Technical Description:

A small to medium-sized deciduous tree in drier sites low and of twisted form, on better sites often a clean straight tree to 20 meters or more tall and with a diameter to 6 dm, the lower bark dark, moderately thick, blocky, grading quickly above to long, tight, narrow rectangles and long, shallow, longitudinal cracks much as in Water Oak.

Twigs: Shoots of a season slender, stiffish, reddish-brown with a scattering of small, stellate hairs and a relief of pale raised lenticels, the terminal buds lance-ovoid, ca. 3-4 mm long, acute, the imbricated bud scales ovate, not angled, the margins ciliate, the backs pale reddish-brown and smoothish. Older shoots becoming glabrous, grayish or grayish-brown.

Leaves: alternate in a spiral, somewhat spreading, short-(1 cm or less) petioled, the blades mostly obovate, similar in outline to Blackjack Oak (Q. marilandica) but mostly thinner, exclusive of those of suckers or stump sprouts 5-10 cm long, sometimes apically with 3-5 low rounded lobes, these each with an excurrent prickle, sometimes lobeless and broadly rounded, or obtuse or truncate, the margin below the broad apex always entire, the base either cuneate or narrowly rounded, the upper surface a rich, dark yellow-green, the major veins strongly impressed and, when young, stellate-hairy, the lower surface paler, the main veins strongly raised, cottony lanose in the axils, otherwise with a scattering of stellate pale reddish-brown hairs (these often not persisting to fall).

Fruit: Ripening in 2 years, 1-2 per peduncle, the peduncles short, stout; acorn cup shallow, less than 1/3 of the nut height in length, 1.2-1.5 cm across, the numerous tightly imbricated scales narrowly triangular, the narrowed tips truncate, the margins narrow, reddish-brown, the backs velutinous with very small, appressed gray hairs; nut dull brown, sometimes striped, nearly round, about 1 cm long, minutely puberulent.

Distribution and Flowering Time:

Sandy or sandy clay uplands or upper ravine slopes, Coastal Plain, the southern counties of Arkansas and scattered localities eastward in Alabama, southern Georgia, and northwestern Florida; flowering in late March and April.

Special Identifying Features:

This tree, in the opinion of Trelease, may have arisen as a hybrid between Q. marilandica and Q. nigra. This is a reasonable assumption although other putative parental species might as well be Q. laurifolia or one of the lobed-leaved smoothish southern red oaks. However, one can make a good picture of this taxon by considering it as having leaves of the outline and approximate size of Q. marilandica, with the slender twigs and smallish, rather smooth buds of one of the willow oaks.

Habitat and Management Implication:

Q. arkansana is a rare component of oak-hickory-yellow pine uplands where, if the substrate is high in clay, it achieves its largest known size. In Arkansas the associated pine are *P. taeda*, *P. echinata*, with associated hardwoods including *Carya texana*, *C. tomentosa*, *Quercus falcata*, *Q. velutina*, *Q. alba*, *Q. nigra*, *Q. phellos*, *Ulmus alata*, *Fraxinus americana*, *Acer rubrum*, *Nyssa sylvatica*, with *Cornus florida*, *Cercis*, *Bumelia*, *Vaccinium arboreum*, *Sassafras*, *Prunus mexicana* in the understory. In the eastern localities it appears in the Longleaf Pine-deciduous scrub oak type, usually in the ravine heads and slopes of higher ridges, and is rooted in coarser sands. In such sites it is often in the understory and is a poorer, scrubbier tree that rarely exceeds 15 meters and has such associates as *Pinus palustris*, *Quercus laevis*, *Q. incana*, *Q. margaretta*, *Q. velutina*, *Carya pallida*, *C. tomentosa*, occasional southern Sugar Maple (on slightly lower places), *Osmanthus*, *Cornus florida*, *Cercis*, *Symplocos*, *Vaccinium*.

The greatest threat to this species of oak comes from a conversion of the oak-hickory-pine uplands to plantation pine, this generally involving a poisoning of the poorer hardwoods, a salvage cutting of residual pines and better hardwoods, mechanical site preparation that usually involves root raking or bulldozing and total obliteration of the oak habitat. So far as is known, there are no populations of this rare oak known from public lands, thus it is important that existing habitat for it be identified and preserved where possible. *Q. arkansana* rarely reaches merchantable size, thus is mainly overlooked by loggers. On the other hand it appears not to be a weedy species. Its small niche could be maintained at little if any loss to the upland woodlot manager.

References:

- Sargent, C. S. 1921. Trees of North America, ed. 2, facsimile Dover edition, Vol. 1.
- Kurz, Herman, & R. K. Godfrey. 1962. Trees of northern Florida. University of Florida Press.

SPECIES: QUERCUS arkansana Sargent

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X		X				
Damage			NA					X
No Lasting Effect	X							
Beneficial if Done Properly					X	X		

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Distribution of:

Quercus arkansana Sargent



Hypericum lissophloeus P. Adams

Status: Threatened

Technical Description:

Tall (to 3.5 meters), deliquescent-crowned, smooth shrubs from shallow, widely spreading diffuse roots and frequently producing suckers from roots, the trunks usually simple, branching only in the upper part to form the spreading crown, toward base to ca. 3 cm thick, the lower bark thin, smooth and exfoliating into rectangular curling sheets like some birch, a metallic gray-brown or reddish-gray-brown, upwardly still smooth but tight, more reddish, slick-looking, the primary branches slender, spreading-ascending, elongated, with the reddish or reddish-gray bark exfoliating in thin, rectangular-anastomosing flakes, and producing a mixture of very leafy, larch-like spurshoots as well as normal branches, the latter slender, smooth, when fresh glaucous, often somewhat flattened or angulate, longitudinally ridged, with close-set nodes developing axillary fascicles, thus the branches and ultimate branchlets very leafy.

Leaves: lineal, opposite, sessile, persisting over winter, estipulate, needle-like, the clasping bases at a node joined by a narrow ridge of tissue extending from each margin base, thus leaf base appearing jointed (articulated) to the shoot, the longer blades (not those of spur or axillary shoots!) spreading - ascending, somewhat fleshy, narrowly linear, mostly 1.5-2.0 cm long, to 0.75 mm wide, the narrowed tips blunt-conic, the margins revolute, entire, the upper surface dull green (glaucous when fresh!), flattish or slightly concave, the midrib not evident, the rolled-down margin evidently gland-pitted; lower surface exposed as a narrow groove bordered by 2 low ridges, in combination all narrower than the combined width of the rolled-under margins.

Inflorescence: Flowers single or in cymes of 3 from axils of most of the upper branchlet nodes, the pedicels actually short shoots, usually each with a pair of bracts similar to foliage leaves, the actual pedicel usually shorter than the ovary, definitely shorter than the fruit.

Flowers: perfect, regular; sepals 5, early deciduous, similar to foliage leaves or very narrowly triangular-subulate, mostly 8-10 mm long, distinct to base, ascending or slightly spreading; petals 5, distinct, early deciduous, spreading, asymmetrically rectangular-obovate (as in *Rhexia*), 1.0-1.3 cm long, the broadly rounded or subtruncate apex bearing a spinulose apiculus laterally, the margin entire, the base subtruncate, the surface a rich orange yellow with darker orange veins; stamens very many, joined and crowded at their very base into a low ring around the ovary base, the slender deep yellow or orange-yellow filaments erectish or ascending, forming a mass around the ovary and nearly as long as the petals, the anthers round, pale yellow, dorsifixed; ovary superior, tricarpellate, the body lance-ovoid, smooth, tapering gradually into a narrow erect style that projects slightly above the pale yellow anthers.

Fruit: Capsule lance-ovoid, the body about 5 mm long, deeply 3-lobed, the 3 locules with many small seed, the apex acute, tapering into 3 persistent, now divergent, styles, the surface smooth, a dark

reddish-brown; seeds dark brown, oblong-curve (like a short banana), strongly longitudinally ridged-and-grooved.

Distribution and Flowering Season:

Shores and shallows of limesink lakes and ponds, Coastal Plain, northwestern Florida; flowering from late May through July and intermittently to frost.

Special Identifying Features:

This tall Hypericum is distinguished from other needle-leaved species of its genus first by its peculiar smooth bark that below separates like birch, but the metallic appearance of the bark of upper trunk and bases of larger branches, by the tallness and willowiness of habit, by the glaucousness of fresh shoots and leaves, and by the strongly ribbed character of the seed. According to Dr. Adams, monographer of sect. Myriandra (to which this species belongs!), two other very similar species, H. reductum and H. fasciculatum, grow mixed with this one but in no case have intermediates been observed.

Habitat and Management Implication:

H. lissophloeus is found on the fluctuating shores of a few sink ponds or small lakes in Bay and Washington Counties in northwestern Florida at about the longitude of Panama City. Around these ponds, it may be the most abundant shrub. At high water, its bases may be well submersed, only the waving tops of the upper branches exposed; on the other hand it may be well exposed at low stages and it is then that abundant seedlings and small specimens are in evidence. It may be in the light shade of scattered cypress but is more often luxuriating in full sun and there forming a forest in miniature. The substratum is a moist to quite wet sand, this frequently with a high peat increment, and quite acid. The herbaceous cover under and around the Hypericum is primarily grass-sedge with a sprinkling of Eriocaulon, Xyris, Drosera, Sabatia, Rhexia, Proserpinaca, Centella, Hydrocotyle, Ludwigia, various composites. The rare and local Xyris longisepala, X. isoetifolia, Rhexia salicifolia are frequently associated.

The limesink lakes and ponds are set in Longleaf Pine-deciduous scrub oak sandhills. Much of this area has, in recent years, been subjected to heavy mechanical disturbance, with the pine cleared, the oak and other hardwood scrub removed and with site preparation for plantation pine (mostly either Slash or Sand Pine). Damage to the ponds comes from erosion into them from the surrounding disturbed uplands, from overzealous clearing and bulldozing around the immediate shorelines (wherever these may be in a particular year!) and from increasing development of vacation or retirement housing around these lakes (which are scenic and once offered good fishing). There is also an unwarranted and steadily increasing number of campers, bathers, boaters, water skiers, picnickers and other

recreators that use any unposted shoreline. All of the above activities are damaging the plants of shallows and shorelines, as well as effecting water quality. On the other hand, if access to some of these ponds is restricted, if mechanical disturbance of the contiguous slopes is kept to a minimum or prohibited, there is no reason why some good populations could not be kept.

References:

- Adams, Preston. 1962. Studies in the Guttiferae I. A synopsis of Hypericum, sect. Myriandra. Contr. Gray Herb. 189: 3-51.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 868-874.

SPECIES: Hypericum lissophloeus P. Adams

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy							X	
Damage	NA	X	X	X				
No Lasting Effect								
Beneficial if Done Properly								

Other Comments: Do not disturb shoreline vegetation. Do not drain areas of boggy shoreline.

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Estimated Range of:

Hypericum lissophloeus P.Adams



875

1
1000-2 1-01 0010 0010

LAMIACEAE

Monarda stipitoglandulosa Waterfall

Status: Threatened?

Technical Description:

Perennial, aromatic, 2-10 dm tall, from shallow, elongate rhizomes, the roots slender, fibrous, diffuse.

Stems: Erect, usually unbranched below the middle from a short-decumbent base, quadrate, the angles being broad, rounded ribs, the intervals flat or concave, the internodes short and numerous toward stem base, lengthening upward, in the upper 1/5 developing arching-ascending, opposite branches, these usually terminating in inflorescences; stem surface yellow-green or strongly suffused with purple, smooth save distally where minutely incurled-puberulent with pale hairs.

Leaves: opposite, spreading or ascending, the lower ones gone by flowering time, those at mid-stem slightly the largest, gradually reduced to just below the inflorescence, the petioles mostly 1-2 cm long, slender, troughed above, overall minutely spreading puberulent and remotely sessile-gland-dotted, the larger blades mostly lanceolate, 6-8 cm long, narrowly acute, rather evenly low-serrate, the margin very slightly revolute-thickened, the base broadly cuneate to rounded-oblique, the upper surface a deep yellow-green, minutely puberulent, with a scattering of lepidote glands, the lower surface much paler, strongly gland-dotted, minutely puberulent, the hairs slightly longer and particularly dense on the midrib and lateral veins; venation pinnate, the midrib impressed above, strongly raised beneath.

Inflorescence: an involucrate head, the dense floral mass exclusive of corolla hemisphaerical, 2.0-2.5 cm across the base and ca. 1.5 cm high, subtended by a few flat spirals of leafy involucre bracts these spreading or somewhat reflexed, lanceolate to ovate, mostly 1.5-2.0 cm long, the tips acuminate, sometimes short-aristate, the margins entire and ciliate, the broadly cuneate or narrowly rounded base sessile, the upper surface often pale, cinereous-puberulent, the lower surface darker, similarly puberulent, many of the hairs above and below with minute glands; outer bracts grading into a few series of somewhat shorter, upcurvate, lance-linear bracts, these strongly awn-tipped, hirsute-ciliate and also minutely stipitate-glandular-puberulent, these hairs sometimes intermixed with stouter, peg-like gland-tipped hairs.

Flowers: bisexual, with a regular calyx and a strongly irregular corolla; sepals 5, the tube cylindric, 8-9 mm long, 10-ribbed, pale green dotted with sessile orangish resin glands and minutely stipitate-glandular, at its orifice and for 1-2 mm below the rim inside strongly villous-pilose with inward pointed white hairs, the calyx lobes subulate, awn-like, 1.0-1.5 mm long, erect or slightly spreading at anthesis, sparsely bedecked with coarse, spreading peglike stipitate glands; corolla bilabiate, white, ca. 3 cm long, the narrowly funnelform-tubular base falciiform-excurvate, 1.0-1.2 cm long, the upper lip arching forward in line with the tube, narrowly linear, somewhat folded, its narrowly rounded apex fimbriate-villous with long white hairs, the lower lip broader, oblong, about the same length as the upper and downcurvate, also folded, apically with lateral lobes low, broadly rounded into a central, oblong-linear lobe ca. 3 mm long, this

somewhat fimbriate at tip; external surface white-pilose, dotted with amber sessile glands; stamens 2, epipetalous, the slender, flattened tapering white filaments arising just below the corolla sinuses and arching upward and forward to just under the tip of the upper corolla lip or just beyond, there converging (connivent) the anther connective much flattened and broadened, forming a "T" with the filament apex, the anther sacs linear, divergent 180 degrees, parallel to those of opposing anther; ovary superior, lobed at insertion of style base, the style slenderly linear, arching upward and under the upper corolla lobe, its unequally bifid stigmatic apex projecting just beyond the anthers.

Fruit: nutlets 4, oblong-cylindric, 1.3-1.8 mm long, smooth, brown.

Distribution and Flowering Season:

Dry, openly wooded ridges and ravine slopes or moist, rocky, gravelly moist clearings along streams and rivers, inner Coastal Plain and Interior Highlands, eastern Oklahoma and southwestern Arkansas; flowering from late May well into July.

Special Identifying Features:

This Bee-balm is most similar to M. fistulosa, the commonest and most wide-ranging as well as most polymorphic species. It differs from that species in a more prevalent white corolla, in the minutely stipitate-glandular indumentum of calyx tube, bractlets and sometimes bracts. Waterfall's original description calls for a much lower plant than may be observed on moister, lower sites such as are found for it in western Arkansas. Also, while the Waterfall description indicates only a white corolla, M. stipitoglandulosa may develop clones in which corollas are very light lavender.

Habitat and Management Implications:

M. stipitoglandulosa frequents upland, comparatively dry, shaley or shaley-sandy woods and ravine slopes where the overstory is comprised mainly of oaks and hickories such as Quercus stellata, Q. velutina, Q. coccinea, Q. marilandica, Carya tomentosa, C. texana, together with Pinus echinata. However, the plants are also found downslope in gravelly sandy clay of clearings in or streambanks through mixed mesophytic woodland. Its tolerance to wide fluctuations in soil water appears to be high, and its substrate requirements are very similar to those of Streptanthus squamiformis Goodman, a frequent associate. Like that species, it may come into areas where clearcutting and various methods of mechanical site preparation have been employed.

References:

Waterfall, U.T. 1970. Monarda stipitoglandulosa, a new species from Oklahoma. Rhodora 72 (792): 502-504.

SPECIES: Monarda stipitoglandulosa U.T.Waterfall

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy							X	
Damage								X
No Lasting Effect	X	X	X	X				
Beneficial if Done Properly					X	X		

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Range of:

Monarda stipitoglandulosa Waterfall



LAMIACEAE

Physostegia leptophylla Small

Dracocephalum leptophyllum Small

Status: Threatened

Technical Description:

Smooth, perennial, non-aromatic mint, mostly 7-15 dm tall from a stocky, fleshy caudex, this terminating a slender pale rhizome which produces also whiplike, stoloniferous rhizomes surficially.

Stems: Stiffly erect, simple, usually if branching, branching only in the inflorescence, quadrate, at base 4-8 mm thick, the angles rounded, toward base with nodes close set, at mid-stem and upward distant, the surface proximally and distally often purplish, otherwise pale green, in the inflorescence minutely puberulent.

Leaves: opposite, simple, the lowermost usually absent by anthesis, those at mid-stem usually largest, only the lower ones petiolate, the petioles mostly 3-6 cm long, slender, troughed above, often reddish, the blades mostly lanceolate to elliptic or oblanceolate, erect or ascending, 6-10 cm long, obtuse to bluntly acute, the margin sinuate to low-serrate, the low teeth very ascending, each with a low, callused apiculus, the base attenuate, the surfaces yellow-green (when dry showing a clear pattern of short-oblong cystoliths), pinnate-veined with only midrib above appearing strong, beneath with midrib strongly raised, the lateral veins arcuate, faint but raised; blades upward on stem progressively shorter, narrower, sharper-pointed, more sessile, more distant, grading into bracteal ones 1 cm or less long.

Inflorescence: terminal, indeterminate, either a single spikelike raceme or with an additional pair of racemes, in outline lanceolate, the flowers crowded and overlapping toward its tip, more distant downward as flowers become fruit, the pedicels stiffly ascending, each subtended by a lance-subulate bract shorter than the calyx and pedicel combined, the pedicel at anthesis puberulous, 1.0-1.5 mm long.

Flowers: bisexual, spreading-ascending, the calyx nearly regular, the corolla strongly bilabiate; sepals 5, united, the tube at anthesis narrowly campanulate, from base to lobe-sinus 5-6 mm long, the lobes triangular, sharp-tipped, spreading-ascending, 2-3 mm long, the surface puberulent externally, green as in leaves but with lobe tips often reddish-tinged; petals 5, strongly united and bilabiate, 2.5-3.0 cm long, the tubular base dilating above the lower 1/3 to become broadly funnel-form with the upper (posterior) side slightly arched or nearly straight, the lower (anterior) side more convex and inflated, the limb of 2 lips, the upper slightly longer, ca. 3-6 mm long, from broadly rounded or truncated tip to sinus, but narrower, arched forward and slightly folded, the lower lip 3-lobed, apically slightly downcurved, the central lobe oblong and emarginate, the laterals shorter, salient, rounded or slightly emarginate, the external surface lavender-rose with deeper lines at throat apex and lips, grading paler toward the tubular base, the upper side puberulent, the lateral and lower sides smooth, internally purple-mottled in throat, smooth throughout; functional stamens 4, didynamous, the slender, flattened filaments epipetalous,

arching upward and just under the upper corolla lip, the anthers externally deep purple, dorsifixed, the strongly divergent, reniform anther sacs spinulose-toothed along the slits and presented either just below tip of upper corolla lip or slightly beyond; ovary superior, 4-lobed, bicarpellate, the slender style slightly curved upward with the filaments, the 2, short-linear, excurved, sharp stigmas presented just beyond the upper corolla lip.

Fruit: Nutlets 4, nearly round in outline but often 3-angled, pale brown, smooth, ca. 2.5 mm long.

Distribution and Flowering Season: Swamp woodlands, river and inlet banks and coastal sloughs, Coastal Plain, southeastern Virginia south to northern peninsular Florida, westward into southern Alabama; flowering mostly in May and June, intermittently to August.

Special Identifying Features:

The difficulty with Physostegia is that it is such a distinct genus, meaning that the several taxa are within complexes hard to tell apart. Nearest to P. leptophylla is probably P. purpurea (Walt.) Blake, of wet savanna or swamp woodland in the Atlantic Coastal Plain south into southern Florida. This tends to have the larger leaves more crowded toward the base, rather than at mid-stem or above, and broadest toward the apex and the pubescence of its calyx and inflorescence is, while short, heavier and sharper. Dr. Philip D. Cantino, current revisor of the genus for North America, doubtless knows additional characters, but, from the material I have seen in the field and in the herbarium, there appear to be several intergrading forms.

Habitat and Management Implication:

D. leptophylla is a species primarily of swamp woodlands, particularly where the alluvium overlies calcareous rock or in areas where the streams and rivers empty through broad coastal sawgrass marsh. The substrate is usually a sandy peat muck or sandy silt and, save in driest periods, is saturated. The plants are strongly clonalizing, forming large, showy stands either in full shade or full sun as would be beating on hammock edges, along banks and islands in rivers, or in sweet marsh at edges of sawgrass. The overstory species in the swamp forest are mostly Bald Cypress, Water Tupelo (N. aquatica or N. ogeche), Carolina Ash, Red Maple, Sweet Gum, Willow, Water Hickory, Sugarberry, Elm, various swamp oaks, particularly willow oaks. Sabal palmetto is common in most Florida sites. The shrub layer normally has an abundance of Myrica, Cornus ("Svida"), Styrax americana, Ilex, Sabal minor, tangles of Smilax, Rosa, Itea, Crataegus, etc. Common associated herbs include Sagittaria, Sparganium, Peltandra, Pontederia, Isoetes, Saururus, Polygonum, Penthorum, Proserpinaca, Asclepias (particularly A. perennis), Cicuta, Eryngium yuccifolium synchaetum, Hydrolea, etc. Chasmanthium nitidum is a common associated grass and frequent sedges are Scirpus fontinalis, S. divaricatus, Rhynchospora corniculata, R. mixta, R. miliacea, Carex lupulina, C. joorii.

P. leptophylla is impacted primarily by real estate development along

some streams as well as by an increasing conversion of large tracts of swampy hammck to slash pine plantations. This last usually involves a wholesale mechanical site preparation preceded by clear cutting and deep drainage-ditching. These activities cause excessive silting of the small streams, burying of habitat, and in addition creation of habitat too dry for swamp herbs.

Reference:

Small, J.K. 1933. Manual of the southeastern flora, p. 1156.

SPECIES: Physostegia leptophylla Small

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X	X	X			X	
Damage	NA					X		X
No Lasting Effect					X			
Beneficial if Done Properly								

Other Comments: Drainage destroys the habitat!

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Physostegia leptophylla Small



LEITNERIACEAE

Leitneria floridana Chapm.

Status: Threatened

Technical Description:

Small, strongly clonalizing, sparingly-branched, dioecious, deciduous tree, rarely to 7 meters tall, forming large but local populations of stick-like erect stems from a shallowly diffuse and spreading root system, the diameter of the trunk at base rarely to 12 or 13 cm, the bark pale brown, thin, longitudinally cracking and cross-checking to form long, narrowly rectangular tight plates.

Twigs: New shoots slender but stiffish, densely villous-tomentose, later in season becoming progressively smoother, often nearly smooth by fall, then dull gray-brown, with paler, strongly raised elliptical lenticels, teretish but decurrent-ridged below leaf scars, these semicircular, with lower edge strongly raised, the corky surface with 3 large bundle scars, the axillary buds triangular-ovoid, ca. 3-4 mm long, the scales several, tightly imbricate, dark chestnut brown, the outer ones nearly smooth, the inner pale pubescent toward tips, acute, slightly keeled; 2-year and older shoots becoming perfectly smooth, somewhat lustrous, deep purple-brown, the lenticels and leaf scars pale in contrast.

Leaves: Alternate in spiral, estipulate, spreading or ascending on teretish petioles ca. $1/5$ - $1/6$ the total leaf length, at first villous-tomentose, later nearly smooth; leaf blades mostly narrowly elliptic to lanceolate, (8-) 10-15 (-18) cm long, firm, acute, entire, slightly and narrowly revolute, the base cuneate to short-attenuate, pinnately veined, the upper surface yellow-green, paler when young and coated with a soft blonde or pale wooly tomentum, and impressed veiney, later with a persistent fine coat of appressed hairs, the lower surface paler, more densely tomentose, particularly on the strongly raised veins.

Inflorescence and Flowers: Most axillary buds expanding in early spring before leaves emerge to form short, strongly bracteate-scaley conelike catkins. Male catkins oblong, narrowly ellipsoidal or lance-ovoid, mostly 2-3 (-6) cm long, of many, spirally imbricated chaffy bracts, all but the lowermost subtending a flower, these bracts 6-7 mm long, rigid, erectish, lanceolate, narrowly acute, the backs pale-lanate-tomentose, the inner surfaces smooth, dark red-brown; male florets without perianth, supposedly 3 per bract forming a cymule but appearing like a single flower with 3-12 stamens, these with yellowish, nearly round, bilocular anthers these basifixed on slender filaments about as long. Female plants with catkins narrower, fewer-flowered, the lowermost bracts sterile, broadly triangular-ovate, the backs nearly smooth, the fertile bracts similar to those of the male catkin in shape and pubescence, but each subtending a single flower, this subtended by a ring of a few gland-margined small scales; ovary superior, unicarpellate with 1 apical ovule, narrowed at base, the ellipsoidal or obovoid body serocious-tomentose, shorter than the subtending primary bract, subapically bearing an elongate, excurved style projecting beyond the bract tip stigmatic along its inner side halfway to the style base.

Fruit: an ellipsoidal or narrowly obovoid drupe 1.8-2.0 cm long

and pale brown when ripe.

Distribution and Flowering Season:

Pond margins, wet swampy swales, swamp hardwood formations, palmetto-sawgrass marsh, in the Coastal Plain from eastern and south-central Texas, eastward sporadically along the coast (excluding Mississippi and Alabama) to Gulf Coastal Florida southward to the mouth of the Suwannee River; local in the Atlantic Coastal Plain (perhaps extirpated from the mouth of the Altamaha River in southeastern Georgia); in the Mississippi Embayment northward bypassing Louisiana but locally abundant and perhaps of its best development in the delta of Arkansas and southeastern Missouri.

Special Identifying Features:

Corkwood is the only member of the family Leitneriaceae, a family whose evolutionary position is yet debated. No other southeastern tree combines the sparsely branched, sticklike habit, simple, entire, estipulate leaves, dioecious habit, the strange styler character, and drupaceous fruit. The wood is unique in being the lightest of any southeastern tree and larger specimens were once cut into short lengths to be used for fishing net floats.

Habitat and Management Implication:

Leitneria appears in two rather different habitats. Along the Gulf coast, it is typically found in the narrow zone between sawgrass brackish marsh and contiguous coastal pine-hardwood-Cabbage Palm hammock. In such sites it has become quite rare, probably because in the past it was thinned by fishermen in quest of net floats. In the eastern counties of Arkansas and southern Missouri it is in fresh water marsh, usually along drainages (many now ditched) that traverse bottomland hardwoods. Common associates are Black Willow, Cottonwood, various bottomland oaks including Overcup, Willow, Water, Nuttall, Pin, Swamp Chestnut, Water Hickory, Green Ash, Swamp Red Maple, Drummond Maple, Box Elder, Catalpa, etc. In such bottomland formations it is usually occurring along the edges, not in the deep shade of mature stands, and it is always on high hydroperiod, silty clay substrates. Common shrub associates are in genera Cornus, Styrax, Salix, Sambucus, Cephalanthus, Ilex, Crataegus.

Along the seacoasts the species is threatened by commercial development, particularly as the recreational and fisheries facilities of the Gulf coast are expanded. Inland it is threatened by wholesale conversion of bottomland hardwood systems to cleared and drained fields of row crops such as soybeans, or irrigated fields of rice. Maintenance of this species would be easy, in that it is such a strong clonalizer, but it is not the most esthetically pleasing species, neither has it any significant economic use, thus the motives for its preservation are less. Logging operations in bottomland hardwoods contiguous to Leitneria would themselves pose no threat providing these were selective, involving no drainage and a minimum mechanical disturbance of the substratum.

References:

- Kurz, Herman & R.K. Godfrey. 1962. Trees of northern Florida.
University of Florida Press.
- Sargent, C.S. 1921. Trees of North America, ed. 2, facsimile
edition, Vol. 1. Dover Press.

SPECIES: Leitneria floridana Chapman

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy								
Damage No Lasting Effect	NA	NA	NA	NA			NA	
Beneficial if Done Properly					X	X		

Other Comments: Do not drain!

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Leitneria floridana Chapm.



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ONAGRACEAE

Oenothera pilosella Raf. ssp. sessilis (Pennell) Straley

Oe. sessilis (Pennell) Munz

Status: Endangered

Technical Description:

Perennial from a short, stout rootstock, the roots diffuse-fibrous, slender, the shoots bolting from an overwintering rosette.

Stems: erect or ascending, mostly unbranched or branching only above the middle, 3-7 dm long, 3-4 mm thick, terete, nearly smooth and tannish proximally, shortly above base becoming pubescent with incurved or appressed whitish pilosulous hairs less than 1 mm long, more densely hairy upward toward and into inflorescence, there becoming tomentose.

Leaves: alternate, those of the rosette smaller than mid-cauline ones, mostly oblanceolate, entire to distantly low-dentate; lowermost stem leaves mostly lacking by full flowering time, if present oblanceolate or spatulate, somewhat smaller than and grading into mid or upper cauline ones which are linear-elliptic to lanceolate, 6-10 cm long, ascending, acute, entire to distantly low-toothed, denticulate, the base narrowly acute to attenuate, decurrent to leaf base or to a short petiole, the surfaces pale yellow-green, tomentose with appressed white hairs less than 1 mm long; stem leaves gradually diminishing in size upward into the inflorescence.

Inflorescence: flowers stipitate, axillary to bracteal leaves in an indeterminate terminal spike, this solitary or compound by several ascending, elongating branches.

Flowers: bisexual, the calyx irregular, the corolla regular, strongly ascending, showy, mostly 6-7 cm long from base of ovary to petal apex, 4-5 cm across the petals; sepal lobes in bud narrowly lance-ovoid, ca. 2 cm long, the narrowly linear sepal tips erect and parallel, ca. 2 mm long; perianth tube from ovary summit to base of sepal limb narrowly tubular, ca. 2 cm long, grayish-pink, appressed-white-pilosulous, the calyx limb of 4 fused sepal lobes ligulate, ovate or broadly lanceolate, tipped with the 4 linear teeth, appressed-pilosulous externally; corolla with distinct petals 4, pale yellow, spreading, broadly obtriangular, ca. 3 cm long, nearly as broad at slightly emarginate apex; stamens 8, the slender, smooth, pale yellow filaments arising at orifice of perianth tube, 5-10 mm long, the anthers linear-oblong, dorsifixed, deeper yellow, ca. 5 mm long; ovary inferior, clavate (shape of ovary as covered by perianth tube), 1.0-1.5 cm long at anthesis, 4-angled, pilosulous, the erect style slender, 3.0-3.5 cm long, smooth, the 4 stigmatose branches narrowly linear, spreading, 3.5-4.0 mm long.

Fruit: Capsule narrowly ellipsoidal, ca. 1 cm long, 3-4 mm thick, 4-angled, pilosulous, the stipe 1-2 mm long; seeds not seen.

Distribution and Flowering Season:

Sandy silts, sandy-silty clay loams, fine sandy loams, Mississippi Embayment of northern Louisiana, eastern Arkansas, with an outlier

in the Gulf Coastal Plain of Texas (Galveston Co.); flowering in May, June.

Special Identifying Features:

Oe. pilosella sessilis is in sect. Kneiffia of the genus. In this section only two other species, O. fruticosa, O. perennis, are truly perennial. O. perennis is distinguishable on the basis of its smaller petals (5-10 mm long) and its nodding inflorescence; O. fruticosa (and subspecies) has clavate to oblong fruit, the sepal tips are shorter (ca. 1 mm long or less). In O. pilosella the capsules which are narrowly clavate to elliptic, and the linear sepal tips are longer. O. pilosella sessilis is distinguished from O. pilosella pilosella by its shorter, more copious pubescence, its shorter ovary, its sepal tips which are erect and closely parallel (rather than spreading).

Habitat and Management Implication:

O. pilosella sessilis appears to be extirpated over much of its former range. Straley, the last monographer of sect. Kneiffia (1977) opines that it is probably now found only in the delta of Arkansas. No collections of it have been made in Texas for more than 150 years! Thus, my statements about habitat related only to where I have seen it in Arkansas.

The habitat appears to have been originally one of low rises in Mississippi delta prairie. Sometimes these are referred to as "rice prairie"; indeed much of this land has been converted to rice culture. The original forest was mostly mixed bottomland hardwoods, the wettest typically cypress-tupelo-swamp privet, the less flooded populated by stands of Nuttall Oak, Willow Oak, Overcup Oak, Sugarberry, Swamp Red Maple, Swamp Ash, Water Hickory, etc., with some higher rises producing mixed upland hardwoods. Much of the higher terrace land was once savanna prairie, kept from being dominated by trees primarily by fire. The dominant vegetation was Big and Little Bluestem, Panicum virgatum, Sorghastrum nutans, Tripsacum, Manisuris, etc., a great variety of carices, Juncus, Sisyrinchium, Tradescantia, Rhexia, Polytaenia, Eryngium, Lysimachia, various Phlox, Physostegia angustifolia, Penstemon digitalis, P. tubaeformis, Amsonia illustris, and many showy compositae in Liatris, Silphium, Helianthus, Echinacea, etc.

What remains of the Oenothera appears to be confined to small areas of original prairie in railroad and highway rights of way. Here the plants appear in very small patches, are rooted in dark prairie earths of what must have been parts of low rises, thus rarely if ever flooded. Such sites, if left undisturbed and protected from fire, would probably be closed by invading woody plants, first shrubs such as Styrax, Cornus, Salix, later by mixed hardwoods, particularly oaks, ash, hickory, elm. Risks to this Evening Primrose are obvious; an increasing acreage is now, because of the richness of the soil, devoted to row crops of corn, cotton, soybeans, as well as rice. Aggravating the problem is the tendency for large areas of railroad right of way, a last refuge, to be given over to cultivation, thus these bits of natural prairie land vanishing forever.

References:

- Gleason, H.A. 1963. The new Britton & Brown illustrated flora of the northeastern United States and adjacent Canada, New York.
- Munz, P.A. 1965. Onagraceae. N. Am. Fl. ser. 2, 5: 1-278.
- Pennell, F.W. 1919. A brief conspectus of the species of Kneiffia with the characterization of a new allied genus, Bull. Torr. Bot. Club 46: 363-373.
- Straley, G.B. 1977. Systematics of Oenothera sect. Kneiffia (Onagraceae). Ann. Mo. Bot. Gard. 64: 381-424.

SPECIES: Oenothera pilosella Rar. ssp. sessilis (Pennell) Straley

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy							X	
Damage		NA	NA	NA				X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Known Distribution of:

Oenothera pilosella Raf. ssp. Sessilis (Pennell)Straley



ORCHIDACEAE

Genus: Platanthera (Habenaria, in part)

Several species of Platanthera have been placed on various Federal and State lists of threatened and endangered species. In that the floral structure in orchids is so involved, and to avoid lengthy and repetitive detail for each writeup, I am giving a brief general description of vegetative and floral character for Platanthera.

All Platanthera are perennial, have a fascicle of fleshy, sometimes tuberous roots, and an erect, fleshy, leafy stem, the lowest leaves mostly sheath, those above toward mid-stem larger, with well-developed sheaths and the largest blades, mostly of a narrow outline, while those in the upper part of the stem are usually, often abruptly, much smaller, becoming sheathless, and perhaps best described as peduncular bracts.

The inflorescence is often referred to as racemose, but is actually a bracteate spike of (usually) many flowers, these disposed in an open or tight system, and variously oriented.

The flower in basic construction is a central type for orchids, with a lot of adnation and asymmetry. The ovary is, of course, inferior, tricarpellate, enveloped by and adnate to the floral tube which has a narrowed base, is expanded over the narrowish ovary, then slenderly tubular, quite elongated, and flaring abruptly into the very irregular perianth limb of 3 sepals and 3 petals. The sepals tend to be more uniform, with the upper (dorsal) sepal tending to be more concave and broader, spreading upward and arching forward, and the other 2 flatter, usually narrower, spreading out and downward at an angle of about 45°. The petals are 3, 2 of which are spread upward at an angle of about 45°, with their inner edges usually under the overarching dorsal sepal; the 3rd petal is largest, is referred to as the labellum (lip), and is directed outward and downward. The labellum may be variously shaped, entire or 3-lobed or fringed or in places callused; in the taxonomy of Platanthera, the lip character is probably the most important criterion. At the base of the lip is a small pore, this the opening to a slender-tubular, downward or backward-directed, spur, the dilated base of which produces nectar (reached only by long-tongued insects!) The perianth and male and female parts of this genus, as in other orchids, is coalesced into what is called a "column", which in Platanthera is short, rather broad, capped by a single broad, bilocular anther, the anther sacs each containing a pollinium (a clavate mass of agglutinated pollen

grains) but separated by stigma and connective tissue. On the column face, between the bases of the anther locules, is a stigmatic zone (2 coalesced), which is located just above the opening into the spur. As a long-tongued insect reaches the flower, its face comes into contact with that of the orchid, meeting the narrowed sticky (viscidial) exposed ends of the pollinia and at the same time contacting the stigma. When the insect withdraws, it often pulls away the sticky-ended pollinia, thus insuring pollination of the next flower visited.

The fruit in orchids is always capsular, the seeds minute, with no endosperm; germination must take place soon after the capsule ripens.

ORCHIDACEAE

Platanthera flava (L.) Lindl.

Habenaria flava (L.) R.Br.

Status: Threatened?

Technical Description:

Stems: slender, stiffly erect, 1.5-4.0 dm tall, usually solitary, terete below and multiribbed, usually entirely concealed there by leaf sheaths and to 4 mm thick, pale green, in the inflorescence with low, sharp, papillose ribs, the longer internodes at mid-stem or lower, to 1.5 dm long.

Leaves: in a loose spiral, ascending to erect, the larger foliage leaves 2-4, the lowest usually largest, its tubular sheath somewhat loose, 12-15 cm long, its blade narrowly elliptic or lanceolate, 1-2 dm long, narrowly acute, the margins entire, papillose the base broadly cuneate, folded, clasping, the upper surface a dull deep green, the lower surface markedly paler; leaf blades abruptly smaller, sheathless, sessile upward on stem, margins with the short, lance-triangular-linear inflorescence bracts.

Inflorescence: Spike narrow, 6-15 cm long, about 1.5 cm wide, the flowers ascending in a loose spiral, rather distant in the lower spike, closer in the upper spike at anthesis, each subtended by a green, lanceolate bract (southeastern plants of this species have lower floral bracts no longer than the flower subtended!) mostly 1 cm or less in length.

Flowers: Perianth lobes a pale yellow-green, the floral tube including the inferior ovary short-stipitate, ca. 7-8 mm long, slenderly ellipsoid-fusiform, the narrowed upper part of the tube pale yellow-green, arching outward, the lower part longitudinally low-ribbed, the floral face directed somewhat downward; dorsal sepal ovate, apically narrowly rounded, concave, cupped forward, ca. 4 mm long, the lateral sepal lobes elliptic-oblong, narrower than the dorsal, ca. 3.5 mm long; lateral petals ovate, somewhat asymmetrical, narrowly rounded apically, projecting upward and forward, their inner edges under the overarching dorsal sepal; lip directed downward and backward, broadly oblong, ca. 4.5 mm long, trilobate, the central lobe much the longest and oblong, its apex broadly rounded or truncate, entire, the inner lip surface bearing medially at its base a thickened wide ridgelike process (tubercle); spur clavate-linear, ca. 10 mm long, curved backward and downward along the perianth tube; column short, 1.5 mm high, its truncate apex oblique and with lateral tubercles.

Fruit: Capsule nearly erect, ellipsoidal, to 8 mm long, finely ribbed.

Distribution and Flowering Season:

Sandy silty alluvium of swamp forest, Coastal Plain, Piedmont, southern Appalachians including Interior Low Plateau, Maryland south to northern peninsular Florida, thence west to eastern Texas, inland to southeastern Missouri, southern Illinois, Western Kentucky, middle and western Tennessee; in the Southeast flowering from late June into early August.

Special Identifying Features:

This inconspicuous Rein-orchid is distinguished from the other southeastern greenish-flowered species by a combination of (a.) fringed labellum (2.) anther cells divergent on column head to either side of compound stigma and (3.) a strong, somewhat alate tubercle at lip base. The description and range given above pertain only to the southern variety "flava", not to the longer-bracted northern var. herbiola (R.Br.) Luer.

Habitat and Management Implication:

P. flava, as mentioned above, is a species of swamp woodland, typically roots in moist to mucky silty sands, in the shade of Bald Cypress and hardwoods such as Salix, Carya aquatica, Populus, various willow oaks, Overcup Oak, Basket Oak, Nuttall or Pin Oak, Shumard Oak, Swamp Maple, Nyssa aquatica, N. biflora, Green Ash, Pumpkin Ash, Carolina Ash, Sycamore, Hackberry, Elm (exact species composition differs from one part of the range to another). Common understory shrubs are Cephalanthus, Sambucus, Itea, Lindera, with Myrica, Ilicium, Leucothoe, etc. present in more southern latitudes. Some common herbaceous associates are various Eupanicum, Dichanthelium, Panicum, Glyceria, Leersia, Echinodorus, several carices, including C. stipata, C. debilis, C. bromoides, C. jorii, C. gigantea, C. intumescens, C. crus-corvi, C. lupulina, C. lurida, etc., various Scirpus, Rhynchospora, many Juncus, Commelina virginica and others, Hypoxis (particularly H. leptocarpa), Sagittaria, Echinodorus, Saururus, Rumex, Polygonum, penthorum, Luwwigia, Proserpinaca, Cicuta, Sium, Hydrocotyle, Sabatia calycina, Lindera, Chelone, Micranthemum, swamp woodland Lobelia such as L. Cardinalis and swamp woodland composites. Swamp ferns such as Osmunda, Woodwardia, Onoclea, Athyrium, may be abundant.

From the abovementioned associates it is evident that this orchid grows in places that are very often flooded, sometimes for long periods. Interestingly, it is pollinated by an Aedes mosquito (Luer, 1975), and many herbarium collections still show a fine dust of alluvium placed on them by floodwater!

The greatest danger faced by this particular orchid comes from the wholesale clearcutting of large tracts of bottomland throughout its range. Such cutting results in a raising of water table, thus more than normal flooding of the bottoms. It also results in a conversion from a relatively clean alluvial forest floor to a sunny jungle of invading woody weeds. Another hazard to the orchid comes from conversion of such forest by drainage and clearing either to lowland improved pasture or to row crops, particularly soy beans.

References:

- Correll, D.S. 1950. Native orchids of North America north of Mexico.
Luer, C.A. 1975. The native orchids of the United States and Mexico.
The New York Botanical Garden.

SPECIES: Platanthera flava (L.) Lindl. var. flava

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy	NA	X	X	X		X	X	X
Damage								
No Lasting Effect					X			
Beneficial if Done Properly								

Other Comments: Clearcutting and drainage destroy this habitat.

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Range of:

Platanthera flava (L.) Lindl. var. flava



ORCHIDACEAE

Platanthera integra (Nutt.) Gray ex Beck

Habenaria integra (Nutt.) Spreng.

Status: Threatened

Technical Description:

Smooth, leafy-stemmed orchid 4-8 dm tall.

Stems: slender, stiffly erect, terete, pale green, finely ribbed, at base in sheath ca. 4 mm thick, the nodes several, the internodes in lower 1/2 longest.

Leaves: in a loose spiral, ascending or erect, the largest ones 1 or 2, the sheaths somewhat loose, overlapping to 2 dm long, the blades somewhat folded, narrowly elliptical or lance-linear, 5-20 cm long, narrowed gradually to the bluntly acute apex, the margins entire, the base narrowly cuneate, clasping; blades and sheaths gradually or abruptly reduced up the stem, the blades becoming lance-linear, sessile, clasping, and merging with inflorescence bracts.

Inflorescence: Spike cylindrical or narrowly conical, 2-10 cm long, the flowers very many (-60) in a series of tight spirals, each bloom subtended by a narrowly lanceolate-subulate green bract, the lower bracts 1.0-1.5 cm long, gradually reduced up the spike.

Flowers: perianth lobes a deep yellow orange, the floral tube including the inferior ovary, stipitate, lance-linear, ca. 8-9 mm long, the expanded base green, the ribs papillose, narrow, the narrowly tubular apex yellowish; dorsal sepal broadly elliptic or ovate, concave, rounded apically, ca. 4 mm long, arching upward and forward, the lateral sepals nearly round or very broadly ovate, blunt-tipped, oblique, ca. 5 mm long; lateral petals elliptic, acute, ca. 4 mm long, their inner edges under the hooded dorsal sepal, the lip oblong-elliptic, very short-stalked, rounded, irregularly crenulate, projecting forward and downward, unlobed, the spur lineal-tubular, projecting backward and slightly downward, more or less parallel with perianth tube, 5-6 mm long; column short (ca. 1 mm), truncate oblique with lateral calluses opposite anther cells.

Fruit: Capsule spreading, narrowly ellipsoidal, the narrow ribs papillate.

Distribution and Flowering Season:

Savanna flatwoods, bogs, sunny sphagnum seepage areas, various provinces but mostly in the Coastal Plain, New Jersey south to northern peninsular Florida, west in the Gulf Coastal Plain to eastern Texas, inland throughout South Carolina, Georgia into southwestern North Carolina, through Alabama into middle Tennessee; flowering from late July into September.

Special Identifying Features:

P. integra looks exactly like P. cristata from a distance, only close inspection revealing that its labellum is unfringed rather than fimbriate.

Habitat and Management Implication:

This is a species of sunny, acidic, usually sphagnum seeps. The substrate is at least moist, highly organic, usually a black sandy peat. In the Coastal Plain it is usually in bogs or low places in pineland, is part of a grass-sedge system high in bog Andropogon, Aristida, Panicum, Calamagrostis, Rhynchospora, Dichromena (D. latifolia), bog carices, etc. Some showy associated herbs include other Platanthera, Pogonia, Cleistes, Xyris, Eriocaulon, Aletris, Lilium catesbaei, Tofieldia, Zygadenus, Sarracenia, Drosera, Rhexia, Sabatia and many composites in Coreopsis, Bigelowia, Liatris, Eupatorium, Aster, Helianthus, etc. In inland provinces it is usually very local, mostly confined to small seeps in clearings, or savanna swales in oak-pine woodland.

Throughout its range it is fire dependent, whatever the overstory forest type, and wherever fire is kept out it is overwhelmed by bog, pocosin, or shrub bay types or shaded out by invading pines and hardwoods.

In that it is a bog plant it is destroyed by establishment of drainage ditches. The greatest threat to it is in the heartland of its range, namely the lower terraces of the Gulf and Atlantic Coastal Plain, much of this once expanses of savanna but now converted to plantation pineland.

References:

- Correll, D.S. 1950. Native orchids of North America north of Mexico.
- Luer, C.A. 1975. The native orchids of the United States and Mexico. The New York Botanical Garden.

SPECIES: Platanthera integra (Nutt.) Gray ex Beck

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X		X			X	X
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Drainage destroys the habitat.

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Southeastern Range of:
Platanthera integra (Nutt.) Gray ex Beck



ORCHIDACEAE

Platanthera integrilabia (Correll) Luer

Habenaria blephariglottis (Willd.) Hook. var.
integrilabia Correll

Status: Endangered

Technical Description:

Stems: stiffly erect, usually 1 per rootstock (but plants tending to be gregarious), terete and ribbed, proximally to 5 mm thick, sheathed by leaf sheaths, pale green.

Leaves: alternate in spiral, the larger foliage leaves 2-3, the sheaths loose-tubular, sometimes to 2 dm long, overlapping the blades narrowly elliptic or lanceolate, to 2 dm long, 3 cm wide, the apex narrowly but bluntly acute, the margin entire, papillose, the base strongly troughed, clasping; leaf blades rather abruptly narrowing and shortening upward into the inflorescence, clasping but sheathless.

Inflorescence: a terminal, rather loose, few-to-many-flowered (~20) bracteate, racemelike spike, round or short-oblong in outline, 4-10 cm long, ca. 5 cm broad, the axis angulately sharp-ribbed, the lower bracts longest, green, ascending, narrowly lance-triangular, to 2 cm long, gradually reduced upward in spike.

Flowers: white, spreading-ascending, very fragrant in evening, the floral tube narrowly linear-fusiform, at anthesis ca. 3 cm long, the body and narrowed base strongly ribbed, minutely scabro-papillose, the narrowed tubular apex greenish white or white, slightly excurved; calyx lobes 3, the dorsal broadly obovate, shallowly cupped, ca. 8 mm long, the laterals broadly ovate, blunt-tipped, more strongly rounded on the lower side, ca. 8-9 mm long; upper 2 petals narrowly oblong or oblong-elliptic, blunt-tipped, ca. 7 mm long, the labellum unlobed, lance-spatulate, the lower part a flat claw, the upper 2/3 erose toward the narrowed apex, the spur linear-clavate, 4-6 cm long, directed downward and curving forward; column ca. 4 mm long.

Fruit: capsule narrowly lance-elliptic, strongly papillose-scabrid, ca. 1.5 mm long.

Distribution and Flowering Season:

Boggy, seepy, usually wooded streambanks and ravines, Cumberland Plateau and southwestern Blue Ridge, southeastern Kentucky southward through middle and eastern Tennessee and southwestern Kentucky southward through middle and eastern Tennessee and southwestern North Carolina into northern Alabama and northwestern Georgia; flowering from late July into early September.

Special Identifying Features:

This orchid was first treated as part of Platanthera (Habenaria) blephariglottis, a more robust bog orchid which also has an unlobed lip. However, the labellum of P. blephariglottis is fimbriately fringed, while that of P. integrilabia is at most shallowly erose-toothed.

Habitat and Management Implications:

This Rein-orchid is mostly a plant of shade, rarely small wet clearings, prefers boggy deciduous forested ravine woods, and a moist to wet sandy peaty silt or sandy peat, this often with a sphagnum mat. The overstory will often be dominated by Red Maple, Black Gum, Sweet Gum, Tuliptree, Willow Oak, Water Oak, Beech, with wild Azalea, Viburnum, Alder, Itea, "Svida" dogwood, Cephalanthus, Sambucus, Calycanthus, Xanthorrhiza, highbush Blueberry, frequent in varied proportions in the understory. The herbaceous layer is ferny, with Thelypteris noveboracensis, Athyrium, Polystichum, Woodwardia, Onoclea, Osmunda. Also present may be grasses such as Cinna arundinacea, Calamagrostis cinnoides, Chasmanthium, Agrostis, Leersia, sedges such as Scirpus cyperinus, S. polyphyllus, many carices, several Juncus, particularly J. canadensis, and many dicots such as Rhexia, Oxypolis, Phlox, Lycopus, Chelone, Eupatorium (particularly E. fistulosum, E. perfoliatum), Helenium, Helianthus.

While the soils this orchid grows in are permanently moist they are not often or for long periods flooded. Clearcutting of the hardwood overstory or of the oak-pine woodland of adjacent slopes results in more runoff from these uplands, this burying the bottoms of the small branches in silt. Clear cutting followed by mechanical site preparation exaggerates the problem still more. Thus logging in the vicinity of known populations would have the least damaging effect if it were selective or group-selective. Habitat is also lost when these small bottoms are pastured, the plants quickly disappearing as a result of trampling and grazing.

References:

- Correll, D.S. 1950. Native orchids of North America north of Mexico.
- Luer, C.A. 1975. The native orchids of the United States and Canada. The New York Botanical Garden.

SPECIES: Platanthera integrilabia (Correll) Luer

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		x	x	x			*	x
Damage						x		
No Lasting Effect	x				x			
Beneficial if Done Properly								

Other Comments: * in that overplanting with trees would doubtless involve pine plantation the result would be negative.

 ** any drainage of the soil would have a negative result.

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.



ORCHIDACEAE

Platanthera peramoena (Gray) Gray

Habenaria peramoena A. Gray

Blephariglottis peramoena (Gray) Rydb.

Status: Threatened?

Technical Description:

Smooth, leafy-stemmed orchid to 1 meter tall.

Stems: erect, terete but with longitudinal ribs, pale green, the several internodes stiffish, mostly concealed by overlapping sheathes, at base to 6 mm thick.

Leaves: alternate-spiral, the lowest bladed ones usually largest, 2-5, with sheathes loosely tubular, fully 2 dm long, the blades narrowly elliptical or lanceolate, 10-20 cm long, spreading-ascending, acute, entire and pappilose-margined, the bases acute and clasping, the upper surface deep dull green, the lower surface paler; blades gradually reduced in length and size on stem, becoming sessile, grading into peduncular and inflorescence bracts.

Inflorescence: Spike loosely to densely cylindrical, with up to 50 flowers, the lowest bracts to 3 cm long, lance-linear, grading gradually upward.

Flowers: a showy, bright rose-purple, the floral tube from ovary base to tip 2.5-3.0 cm long, narrowly wing-ribbed over the ovary, green with purple tints, the dorsal sepal broadly elliptic, 5-9 mm long, erect-based but arching forward apically, the lateral sepals asymmetrically broadly obovate, oblique at the truncated, erose apex, 6-9 mm long; upper petals broadly spatulate, 4-8 mm long, the suborbicular, entire apices shallowly cupped, arching upward and forward under and to either side of the dorsal sepal, the labellum 10-15 mm long, with a narrow base and 3 broadly obtriangular, strongly erose-and-truncated-tipped lobes, the laterals spreading at right angles and slightly shorter than the central, the central lobe apically with a narrow sinus; spur narrowly clavate-linear, 2.5-3.0 cm long, projecting backward parallelling the ovary; column viewed from side broadly obtriangular, ca. 3 mm high.

Fruit: capsule ellipsoidal, ca. 1.5 cm long.

Distribution and Flowering Season:

Moist grass-sedge meadows, ditchbanks, stream and river bottoms, various provinces, western New York south to western North Carolina, southwest to southern Missouri, eastern Arkansas, northern Mississippi and Alabama; flowering mostly in July and August.

Special Identifying Features:

This species is distinguished readily from other purple-fringed Platanthera of the southeast by its erose (shallowly notched-margined) rather than fimbriate (fringed) labellum.

Habitat and Management Implication:

P. peramoena appears to be ample in regard to substratum and light but requires constant soil moisture. Moist grass-sedge meadows

and open streambanks appear to be an optimum habitat in the northern parts of its range, although in the south the plants are commonly found in silty-sandy wooded creek and river bottoms, usually in fairly heavy shade. My own experiences with it have been in swampy woodland where the overstory is Nyssa, Liquidambar, Salix, Acer rubrum, bottomland oaks, Populus, Green Ash, Sycamore, with understory shrubs or small trees being Alnus, "Svida" dogwood, Itea, Ilex decidua, Sambus, etc. Ferns such as Osmunda, Athyrium, Thelypteris noveboracensis, Woodwardia areolata, Onoclea, Adiantum are common, along with shade grasses in genera Cinna, Bromus, Festuca, Chasmanthium, Panicum, Elymus, Agrostis in association with numerous carices, Scirpus, and lowland species in Laportea, Urtica, Pilea, Impatiens, Cryptotaenia, Cicuta, Thaspium, Phlox, Blephilia, Cacalia, Eupatorium, Rudbeckia, Verbesina. The orchid is usually scattered in small groups, tends to avoid the muckiest areas which have dense growths of Saururus, Polygonum, Ludwigia, Sagittaria, Commelina virginica, etc.

Danger to this orchid comes from draining of the wet meadows for conversion to improved pasture or to row crop agriculture as well as from clear-cutting of swamp woodland and creek bottoms which causes an abrupt upswing in rank woody and herbaceous growth. Many other creek bottom woodlands have been lost because of channelization of streams which tends to alter soil water conditions.

References:

- Correll, D.S. 1950. Native orchids of North America north of Mexico.
 Luer, C.A. 1975. The native orchids of the United States and Canada. New York Botanical Garden.

SPECIES: Platanthera peramoena (Gray) Gray

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy	NA	x	x	x				x
Damage						x		
No Lasting Effect								
Beneficial if Done Properly					x			

Other Comments:

Area should not be drained!

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Southeastern Range of:
Platanthera peramoena (Gray) Gray



POACEAE

Andropogon niveus Swallen

Schizachyrium niveum (Swallen) Gould

status: Threatened

Technical Description:

Strongly tufted perennial grass 3-5 (-7) dm tall from slender fibrous roots, perennating by short lateral offshoot buds from base.

Culms: erect, slender but stiffish and wiry, the internodes numerous and rather short, smooth, terete to oval in cross-section, 0.2-0.5 mm thick, pale green to straw-colored, the nodes thickened, smooth.

Leaves: Sheathes strongly overlapping at culm base and persisting as fibres, more distant distally, smooth, strongly ribbed, slightly inflated, somewhat keeled; ligule an erect, firm-edged, otherwise thin, keeled, subtruncate, erose to minutely ciliate, scale 0.2-0.4 mm long; blades shortest toward culm base and tips, longest at mid-culm, spreading to reflexed, there lineal, ca. 1 mm wide, mostly 2-5 (-9) cm long, tapering from about midblade to a narrowly acute, scabrid apex, the margins slightly thickened, smooth or minutely scabrid, the midrib strongly raised beneath, the upper surface opposite the midrib strongly grooved, both surfaces at first pale green, later brownish or maroon-tinted, smooth.

Inflorescence: Racemes (2-) 3-5, narrowly lineal, mostly 3-5 cm long, rather distant, rarely overlapping, erect, solitary on slender peduncles 5-6 cm long, these usually well exerted beyond a slender, inrolled peduncular sheath (spathe); rachis of raceme jointed, the joints narrowly clavate, truncate to oblique at hollowed summit, ca. 4-5 mm long, the margins from near base to apex strongly ciliate-bearded with white hairs, those toward joint apex fully 3 mm long.

Spikelets: one pair to each rachis joint and falling with them, the sessile ones perfect or unisexual, the first glume 5-6 mm long, narrowly triangular-lanceolate, firm, the back rounded, stramineous, apically green, the narrow apex with 2 narrow, short, erect teeth, the second glume about as long, keeled-folded, the keel green, the fertile lemma and palea shorter than the glumes, scarious, the floret awned from base, the awn twisted, ca. 1 cm long, bent slightly above the middle; stalk of stalked spikelet densely bearded ciliate as in rachis joints, ca. 4-5 mm long, the spikelet narrowly triangular, green, including the apical long but weak awn ca. 3 mm long; stamens 3, the anthers ca. 3 mm long.

Distribution and Flowering Season:

Deep white or yellow sands of sandhills, central peninsular Florida; flowering from September to frost.

Special Identifying Features:

A. niveus is part of a complex of andropogonids that have the raceme rachis joints hollow at apex, there truncated, and which have primary peduncles terminating in but a single raceme of spikelets (genus Schizachyrium, according to Gould et al). Within this group it stands out from the rest by a combination of its slender, rather low, habit,

its very slender, strongly white-villous-margined rachis joints and spikelet stalks (which give it a strong superficial resemblance to some Andropogon in sect. Arthrolophis!), its nearly completely smooth foliage and its densely caespitose habit. Also distinctive is the tendency for the mature raceme to be straight, rather than sinuous as it is in closely related species.

Habitat and Management Implication:

A. niveus appears to be confined to dry sandy areas in sandhills scrub, where, along with various Aristida, Cenchrus, Panicum, Sorghastrum secundum, and other Andropogon (particularly A. floridanus), Paronychia, STipulicida, Lechea, Petalostemon carolinianum, Heterotheca, Opuntia, etc. it may be locally abundant. Common understory shrubs and low trees are Garberia, Ceratiola, Ilex, Bumelia, Lyonia, Asimina, Osmanthus, Ximinea, Myrica, shrubby evergreen Quercus, Persea, etc. Common overstory associates are Pinus clausa, P. elliotii, or P. palustris, though of the pines the first is usually the most frequent. With the pines on white sands such hardwoods as Quercus myrtifolia, Q. chapmanii, Q. geminata, Carya floridana dominate with a shift over toward Quercus incana, Q. margaretta, Q. laevis on the yellow sands where Pinus palustris is more abundant. In natural conditions such shade intolerant grasses as this Andropogon give way to invading reproduction of shrubs and trees, but increase directly after natural fires sweep through. Mechanical clearing of scrubland provides open sandy area for its increase, if there are contiguous seed sources available.

References:

- Hitchcock, A.S. & Agnes Chase. 1951. Manual of the grasses of the United States, ed. 2 (revised by Agnes Chase). U.S.D.A. Misc. Publ. 200, U.S. Govt. Printing Office.
- Swallen, J.S. 1941. Andropogon niveus, sp. nov. in Wash. Acad. Sci. Journ. 31: 354.

SPECIES: Andropogon niveus Swallen

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy							X	
Damage No Lasting Effect		X	NA	X				X
Beneficial if Done Properly	X				X	X		

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Estimated Range of:

Andropogon niveus Swallen



POACEAE

Andropogon niveus Swallen

Schizachyrium niveum (Swallen) Gould

Status: Threatened

Technical Description:

Strongly tufted perennial grass 3-5 (-7) dm tall from slender fibrous roots, perennating by short lateral offshoot buds from base.

Culms: erect, slender but stiffish and wiry, the internodes numerous and rather short, smooth, terete to oval in cross-section, 0.2-0.5 mm thick, pale green to straw-colored, the nodes thickened, smooth.

Leaves: Sheathes strongly overlapping at culm base and persisting as fibres, more distant distally, smooth, strongly ribbed, slightly inflated, somewhat keeled; ligule an erect, firm-edged, otherwise thin, keeled, subtruncate, erose to minutely ciliate, scale 0.2-0.4 mm long; blades shortest toward culm base and tips, longest at mid-culm, spreading to reflexed, there lineal, ca. 1 mm wide, mostly 2-5 (-9) cm long, tapering from about midblade to a narrowly acute, scabrid apex, the margins slightly thickened, smooth or minutely scabrid, the midrib strongly raised beneath, the upper surface opposite the midrib strongly grooved, both surfaces at first pale green, later brownish or maroon-tinted, smooth.

Inflorescence: Racemes (2-) 3-5, narrowly lineal, mostly 3-5 cm long, rather distant, rarely overlapping, erect, solitary on slender peduncles 5-6 cm long, these usually well exerted beyond a slender, inrolled peduncular sheath (spathe); rachis of raceme jointed, the joints narrowly clavate, truncate to oblique at hollowed summit, ca. 4-5 mm long, the margins from near base to apex strongly ciliate-bearded with white hairs, those toward joint apex fully 3 mm long.

Spikelets: one pair to each rachis joint and falling with them, the sessile ones perfect or unisexual, the first glume 5-6 mm long, narrowly triangular-lanceolate, firm, the back rounded, stramineous, apically green, the narrow apex with 2 narrow, short, erect teeth, the second glume about as long, keeled-folded, the keel green, the fertile lemma and palea shorter than the glumes, scarious, the floret awned from base, the awn twisted, ca. 1 cm long, bent slightly above the middle; stalk of stalked spikelet densely bearded ciliate as in rachis joints, ca. 4-5 mm long, the spikelet narrowly triangular, green, including the apical long but weak awn ca. 3 mm long; stamens 3, the anthers ca. 3 mm long.

Distribution and Flowering Season:

Deep white or yellow sands of sandhills, central peninsular Florida; flowering from September to frost.

Special Identifying Features:

A. niveus is part of a complex of andropogonids that have the raceme rachis joints hollow at apex, there truncated, and which have primary peduncles terminating in but a single raceme of spikelets (genus Schizachyrium, according to Gould et al). Within this group it stands out from the rest by a combination of its slender, rather low, habit,

its very slender, strongly white-villous-margined rachis joints and spikelet stalks (which give it a strong superficial resemblance to some Andropogon in sect. Arthrolophus!), its nearly completely smooth foliage and its densely caespitose habit. Also distinctive is the tendency for the mature raceme to be straight, rather than sinuous as it is in closely related species.

Habitat and Management Implication:

A. niveus appears to be confined to dry sandy areas in sandhills scrub, where, along with various Aristida, Cenchrus, Panicum, Sorghastrum secundum, and other Andropogon (particularly A. floridanus), Paronychia, Stipulicida, Lechea, Petalostemon carolinianum, Heterotheca, Opuntia, etc. it may be locally abundant. Common understory shrubs and low trees are Garberia, Ceratiola, Ilex, Bumelia, Lyonia, Asimina, Osmanthus, Ximinea, Myrica, shrubby evergreen Quercus, Persea, etc. Common overstory associates are Pinus clausa, P. elliotii, or P. palustris, though of the pines the first is usually the most frequent. With the pines on white sands such hardwoods as Quercus myrtifolia, Q. chapmanii, Q. geminata, Carya floridana dominate with a shift over toward Quercus incana, Q. margareta, Q. laevis on the yellow sands where Pinus palustris is more abundant. In natural conditions such shade intolerant grasses as this Andropogon give way to invading reproduction of shrubs and trees, but increase directly after natural fires sweep through. Mechanical clearing of scrubland provides open sandy area for its increase, if there are contiguous seed sources available.

References:

- Hitchcock, A.S. & Agnes Chase. 1951. Manual of the grasses of the United States, ed. 2 (revised by Agnes Chase). U.S.D.A. Misc. Publ. 200, U.S. Govt. Printing Office.
- Swallen, J.S. 1941. Andropogon niveus, sp. nov. in Wash. Acad. Sci. Journ. 31: 354.

SPECIES: Andropogon niveus Swallen

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy							X	
Damage		X	NA	X				X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Estimated Range of:

Andropogon niveus Swallen



POACEAE

Elymus svensonii Church

Status: Proposed endangered

Technical Description:

Tufted, e-rhizomatous perennial glaucous grass from a diffuse-fibrous root.

Culms: Erect but arching-nodding-tipped in flower and fruit, terete, pale yellow-green, numerous leafy and therefore with lower nodes and internodes mostly covered by sheath, exposed nodes subtended by a slightly concave purplish or dark green band.

Leaves: 6-8, the leaf sheaths mostly overlapping, pale green, straw-colored or pinkish, rather tight when young, the thin edges meeting or overlapping save at apex, there flanged to form at the collar a firm, lustrous-cartilaginous auricle, this produced outward to a pair of spreading, narrowly triangular, brownish or purplish lobes; ligule continuous, an erect, when young purplish, erose-edged scale 0.2-0.3 mm high; leaf blades spreading or erect, the lowest withered by anthesis, lineal, flat save for the very slender, long-tapering involuted tips, the longer blades 1.5-3.0 dm long, the margins slightly thickened, scabrid, the upper surface deep green, finely ribbed, scattered-pilose, the lower surface markedly paler, smooth, finely raised-ribbed.

Inflorescence: Spikelets numerous, sessile in pairs in a slender, somewhat interrupted, narrow, excurved spike 10-18 cm long, 5-10 mm thick (exclusive of awns!), the spike rachis somewhat sinuous, the joints flattened, 0.7-0.8 cm long, the margins harsh, with the spikelet pairs alternate on opposite sides, thus in 2 opposite rows with lemma tips (exclusive of awns) barely or not at all overlapping on a side.

Spikelets: 4 (-5)-flowered, flattened somewhat in a plane perpendicular to the rachis (edges to it), erect, exclusive of awns 1.0-1.5 cm long, the glumes 2, subulate-setaceous, scabrid, 1-10 (-18) mm long or (particularly on basal spikelets) absent, from a strong, purple-margined callus, erect, terete save toward base, smooth proximally, antrorsely scabrid apically, often purplish-tinted; fertile florets usually not more than 3, the terminal one sterile, much reduced at tip of a conspicuous rachilla joint, the fertile lemmas ca. 1 cm long, narrowly elliptic or elliptic-lanceolate, the broadly rounded backs smooth, pale yellow-green, the nerves confined to the inrolled margins, with the midrib evident only apically where excurrent as a strong, ascending-excurved, antrorsely scabrid, often purplish, awn 2.0-2.5 cm long; palea elliptic-linear, thinner than the lemma and slightly shorter, its apex narrowed, truncate to slightly emarginate, its back slightly concave, sharply involute at the marginal green nerve; stamens 3, the anthers yellow, lineal, ca. 5 mm long.

Fruit: Grain oblong, brown, ca. 6 mm long.

Distribution and Flowering Season

Dryish calcareous rocky river bluffs, so far known only from along the Cumberland River near Nashville and along the Caney Fork River in middle Tennessee; flowering in late May and June.

Special Identifying Features

This rare grass is distinguished as part of a small complex of eastern North American species which have setaceous glumes unequal in length or even vestigial. There are but two others besides *E. svensonii*, namely *E. hystrix* L. (*Hystrix patula* Moench) and *E. diversiglumis* Scribn. & Ball. The former, which shares the same habitat, has stiffly erect spikes and spikelets spreading horizontally; its glumes often do not develop at all (in *E. svensonii* the spikes tend to nod or excurve strongly, the spikelets tend to be erect and usually at least some spikelets have well developed glumes. The latter, which does not overlap in range, has erect spikelets as in *E. svensonii* but its lemma backs are densely hirsute. Its foliage is not glaucous as it is in *E. svensonii*. Were it not for the unequal glumes, *E. svensonii* most resembles *H. interruptus* Buckl. (*E. canadensis* L. var. *interruptus* (Buckl.) Church), a taxon now considered to be endemic to western Texas.

Habitat and Management Implication

E. svensonii thus far has been found only on shallow soils over bluff limestones, usually in full sun but sometimes in light shade. In the two known localities it is abundant and reproducing freely. The soil is thin, sticky when wet, basic in reaction, quite dry in summer. The forest of these areas is indicative of the basic character of the soil, is mostly hardwoods with patches of *Juniperus virginiana* in various stages of succession to hardwoods. Common trees are *Carya carolinae-septentrionalis*, *C. ovata*, *Quercus shumardii*, *Q. muhlenbergii*, *Q. alba*, *Ulmus serotina*, *U. americana*, *U. rubra*, *U. alata*, *Celtis laevigata*, *Morus rubra*, *Gleditsia*, *Robinia pseudo-acacia*, *Acer saccharum*, *Fraxinus americana*, *F. quadrangulata*, *Tilia americana*, etc. The understory is heavy in *Cercis*, *Rhus*, *Viburnum rufidulum*, *Rhamnus caroliniana*, *Bumelia lycioides* with the lower shrub layer dominated by *Hypericum frondosum*, *Rhus aromatica*, *Symphoricarpos orbiculatus*. Herbaceous associates include *Woodsia obtusa*, *Asplenium*, *Pellaea*, *Bromus purgans*, *Chasmanthium latifolium*, various *Panicum*, *Festuca obtusa*, other *Elymus*, particularly *E. hystrix*, *E. virginicus*, *Danthonia spicata*, various carices, *Mirabilis*, *Arabis laevigata*, *A. canadensis*, *Ranunculus fascicularis*, *Aquilegia canadensis*, *Geum vernum*, *G. canadensis*, *Spigelia*, *Lithospermum*, *Campanula americana*, *Rudbeckia triloba*, various *Solidago*, etc. In the Caney Fork locality are rarities that either are found to the west or north (*Erysimum capitatum*), to the south (*Eriogonum harperi*) or northeast (*Draba ramosissima*). This Wild-rye is most abundant on rocky slopes and ledges where it gets full sun, and in fact is thriving on one stretch of road cut.

Logging would pose a threat, making the thin soils more susceptible to erosion, but the very steepness of the terrain makes this activity unlikely. In that the *Elymus* is a species of light shade or woodland edges, careful removal of some trees might actually increase suitable habitat. Pasturing has undoubtedly caused some damage in the Caney Fork area, but the stock has been fenced away from the steepest slopes and bluffs where the *Elymus* is most abundant.

It is encouraging that this grass will occupy freshly disturbed area such as road cuts.

References:

Church, George L. 1967. Taxonomic and genetic relationships of eastern North American species of Elymus with setaceous glumes. Rhodora 69 (778): 121-162.

Hitchcock, A.S. & Agnes Chase. 1950. Manual of the grasses of the United States, ed. 2, pp. 247-267.

SPECIES: ELYMUS svensonii Church

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy	NA	NA	NA	NA			NA	
Damage						X		X
No Lasting Effect					x			
Beneficial if Done Properly								

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Distribution of:

Elymus svensonii Church



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POACEAE

Manisuris tuberculosa Nash

Status: Threatened

Technical Description:

Perennial, smooth, tall grass, the culms solitary or in small tufts, sometimes stocky-rhizomatous, the roots fibrous.

Culms: erect or ascending, 8-15 dm tall, slender but rather stiff, brittle, wand-like toward apex, terete, the internodes several, the lower internodes mostly covered by sheath, the middle and upper ones shortest, mostly exposed, green or pale purplish or reddish-green, 4-5 mm thick, the nodes swollen, the collar a narrow purplish band.

Leaves: distichous, toward base crowded, the sheathes there strongly overlapping strongly keeled (folded sharply) and forming a chevron pattern, those upward on culm increasingly more distant, the larger ones less than 1/2 the leaf length; ligule a thin, erect, ragged margined scale 1.5-2.0 mm high; leaf blades erect or ascending, narrowly linear, to 6 dm long, proximally somewhat folded, upwardly flattened but midrib prominent throughout, toward apex gradually narrowing to a narrowly acute tip, the margins distally minutely scabrid, the surfaces when young green, but usually by flowering and fruiting time turning brown or maroon.

Inflorescence: culms branching from upper nodes, the ultimate peduncles branching from these branches, all branches ascending or arching slightly outward, the total inflorescence narrow, the many peduncles 5-10 cm long, sleeved half or more their slender length by tubular spathe sheaths, and each terminating in a narrowly cylindric raceme, this 3-6 cm long, straight or excurvate, the raceme rachis jointed, the joints thickish, rectangular in outline, ca. 3.0-3.5 mm long, separating at maturity, each in cross-section semicircular, thus the back rounded and ribbed, the inner face flattish or slightly concave, producing at its base 2 spikelets, 1 sessile and fertile, the other reduced, smaller, sterile, and borne on a stubby stalk (rachilla) similar to the rachis joint and of the same length.

Spikelets: paired as stated above, the sessile one 1-flowered, lance-triangular, flattened against the rachis joint and stalk of sterile spikelet, ca. 4 mm long, the first glume external, giving the spikelet its shape, firm, lustrous, nearly smooth or with a few widely spaced domeshaped processes or transversely-oriented low, truncated tubercles on its back, its abruptly infolded margins narrow, scarious, and enfolding much of the rest of the spikelet; second glume thinner, about as long as the first glume but sharper pointed and keeled; fertile lemma very thin, pale, keeled, triangular, acute, about as long as the first glume; fertile palea also thin, slightly shorter than the lemma, blunter, the back slightly convex, not keeled; mature anthers 3, on shortish filaments, oblong, ca. 3 mm long, cinnamon-red; stalked spikelet similar to sessile one but smaller, and of only the 2 glumes.

Grain: oblong-linear, slightly shorter than the palea.

Distribution and Flowering Season:

Sandy peaty margins and shallows of pineland ponds, karst lakes

and ponds, savanna swales, northern peninsular Florida, west into the Florida panhandle and southern Alabama. Flowering and fruiting from June till frost.

Special Identifying Features:

There is no doubt that the nearest species to M. tuberculosa is M. rugosa (Nutt.) Ktze. The two might well be considered varieties or mere forms of one species in that the only difference between them is the degree of rugosity of the backs of the glumes, which in M. rugosa are strongly and deeply transversely rugose. The raceme rachis joint in the latter is also medially contracted, a feature not held by M. tuberculosa.

Habitat and Management Implication:

M. tuberculosa appears to be confined to karst areas in Florida and Alabama and there may be abundant locally on the margins or in shallows of lakes and ponds or in wet savanna swales. Its shallow roots are in sandy peat or sandy peat-muck, a substratum that is usually at least moist, generally saturated. It may be in pure stands or scattered in an essentially grass-sedge meadow with such grasses as Panicum tenerum, P. hemitomon, P. condensum, P. rigidulum, various Andropogons, Eleocharis cellulosa, E. melanocarpa, E. vivipara, E. interstincta, E. tricostata, Dichromena colorata, Psilocarya nitens, Cyperus articulatus, C. strigosus, C. distinctus, Rhynchospora microcarpa, R. perplexa, R. tracyi, R. inundata, etc., Scirpus americanus, many Xyris, many Polygonum, many Ludwigia but especially L. alata, L. suffruticosa, Rhexia, Proserpinaca, shrubby and herbaceous Hypericum, etc. Such areas are typically very unstable as regards water level, during some seasons drying completely, during others filling up to surrounding forest. Thus the Manisuris may be part of a large belt or expanse of waving grass-sedge or not much in evidence at all during times of extreme drought or extreme flooding. This makes meaningful population estimates difficult. Shallower ponds tend to fill up gradually, Hypericum, Stillingia, Crataegus (wetland species), Nyssa biflora, N. ogeche, Taxodium ascendens, Ilex taking over. Immediate uplands may be dominated by Live Oak, the higher ground above these Longleaf Pine-deciduous scrub oak, Sand Pine-evergreen scrub oak, or sometimes high hammock with plenty of Cabbage Palm.

Logging of the better trees, these usually at the upper edge of maximum pool or above would probably have little adverse effect unless it were accompanied by extensive soil disturbance or followed by some of the more destructive methods of site preparation. It is also suggested that drainage ditching into the high hydroperiod soils of the pondshores and bottoms, as has sometimes been done, is detrimental.

References:

Hitchcock, A.S. & Agnes Chase. 1951. Manual of the grasses of the United States, ed. 2 (revised by A. Chase). U.S.D.A. Misc. Publ. 200, pp. 785-787.

Kral, R. 1973. Some notes on the flora of the southern states,
-particularly Alabama and middle Tennessee. Rhodora 75 (803): 366-410.

Small, J.K. 1933. Manual of the southeastern flora, pp. 41.

SPECIES: Manisuris tuberculosa Nash

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		NA	NA	NA			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Upslope clearcutting or mechanical site preparation may cause problems with sedimentation. Drainage destroys the habitat!

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Known Distribution of:

Manisuris tuberculosa Nash



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POACEAE

Panicum nudicaule Vasey

Status: Threatened

Technical Description:

Tufted perennial Dichantherium, the vernal culms therefore arising from a strong overwintering rosette.

Culms: Vernal culms erect, mostly 2-5 dm long, slender but stiffish even though soft, terete and multiribbed, the internodes few, shortest and crowded toward plant base, elongated upculm, therefore leaves concentrated toward base.

Leaves: Rosette leaves largest, with short, loose, loosely pilose sheathes, with blades lance-linear to elliptic-linear, 5-15 cm long, 0.5-1.2 cm wide, narrowly acute, the margin smooth, a narrow, pale, thin band; ligule a narrow band of white, erect hairs to 0.4 mm long; upper and lower blade surfaces smooth, bright yellow-green, sometimes tinged with maroon, the lower surface finely but prominently ribbed, the upper surface ribs inconspicuous; lower culm leaves similar to and but slightly smaller than those of rosette; mid-and-upper culm leaves erect, abruptly much smaller, distant, and few.

Inflorescence: Spikelets numerous in a diffuse, broadly ovoid panicle mostly 4-8 cm long, the sinuous slender branches widely ascending, pale green with tints of maroon, minutely scabrid, the peduncle of the panicle usually well extended above the uppermost culm leaf.

Spikelets: glabrous, on pedicels of varying length, ellipsoidal to lance-ovoid, 2.8-3.0 mm long, pale green or tinged with purple, the first glume ca. 1 mm long, broadly to narrowly ovate, very thin with only the mid-nerve prominent, the second glume ca. 2.5 mm long, lanceolate, acute and apiculate, pointed beyond the fruit, the back prominently but widely nerved; sterile lemma slightly shorter than to as long as the second glume and similar to it; fruit (fertile lemma, palea and enclosed grain) plano-convex (convex backed, flat on side of fertile palea), narrowly ovoid, ca. 2 mm long, pale green, smooth and lustrous.

Distribution and Flowering Season:

Acid organic sands, peaty or silty muck of open stream and river bottoms, seep bogs, wet savanna, Gulf Coastal Plain, western Florida west into southern Mississippi; vernal culms flowering from late April through May; autumnal culms presumably flowering from mid-summer to frost.

Special Identifying Features:

Most Dichantherium panicums have hairy spikelets. This one does not, and can be distinguished readily from the others that do not by a combination of short ligule, leaves crowded toward plant base. Of those in this complex that have rather large spikelets with second glume and sterile lemma pointed beyond the fruit (P. scabriusculum, P. cryptanthum, P. yadkinense) the first has hispid and

spreading (rather than pilose and ascending) sheath hairs and is a taller plant; the second and third are taller and somewhat more slender plants with smooth sheathes, and the second has smaller (1.5 mm) fruit.

Habitat and Management Implication:

This rare grass is most frequent in boggy sites or acidic openings in the titi dominated woods along streams, is on wet peaty or silty sandy substrates that are frequently flooded. It, like most other wet savanna and bog herbs and grasses, is a plant of full sun, thus is suppressed by invasion of shrub and overstory woody species, increases with release through fire or timbering if this is unaccompanied by soil disturbance or draining. It is eliminated if the land is drained and is either strongly reduced or totally eliminated by most site preparatory methods, with bedding perhaps being the least damaging.

References:

Hitchcock, A.S. & Agnes Chase. 1950. Manual of the grasses of the United States, Ed. 2 (revised by A. Chase). U.S.D.A. Misc. Publ. 200. U.S.Govt. Printing Office.

Small, J.K. 1933. Manual of the southeastern flora, p. 73.

Vasey, George. 1889. P. nudicaule in U.S.Dept. Agr.Div. Bot. Bull. 8: 31.

SPECIES: Panicum nudicaule Vasey

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X		X			X	
Damage			X					X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Drainage destroys the habitat!

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Range of:

Panicum nudicaule Vasey



POACEAE

Sporobolus teretifolius Harper

Status: Threatened

Technical Description:

Strongly tufted, wirey-leaved-and-culmed perennial grass 6-10 dm tall, increasing by compact-compressed lateral-basal offshoots, the roots rather thick, diffuse-fibrous.

Culms: erect to ascending, straight and slender but rather stiff, terete, smooth, pale yellow-green.

Leaves: crowded toward culm base, few, shorter and more distant upward on culm, the longest, including sheath, ca. 1/2 the plant height, the older sheath bases persisting as a stubble of chaff and fibers, the fresh sheath about 1/5 the leaf length, firm, flavescent with red or purple tinges distally, toward base broad and clasping with thin, paler, hyaline margin, the back rounded, low-ribbed, gradually tapering into the blade, there silvery pilose, the blades filiform, erectish or slightly spreading, medially and basally flat or somewhat inrolled with a narrow, slightly thickened, minutely scabrid margin and ca. 1-2 mm wide, above middle strongly folded so as to be terete or oval in cross section, or terete from base to tip, always finely low-nerved, always smooth, narrowing very slightly to a narrow, bluntish, scabrid tip.

Inflorescence: spikelets very many in a diffuse panicle of numerous subwhorled or alternate, smooth, primary branches with pilose or pilosulous axillæ, the peduncles slender, narrowly clavate, ascending, the whole inflorescence in outline elliptical, lance-ovate or narrowly ovate, 2-4 dm long.

Spikelets: Glumes 2, lanceolate, straw-colored or purplish-brown, the first 2.5-3.0 mm long, the second 4.5-5.0 (-5.5) mm long, narrowly acute, chaffy, the backs proximally rounded, distally somewhat keeled, only the midnerve evident; fertile florets 1 (not even a vestigial rachilla joint evident!), ca. 3 mm long, the lemma and palea subequal, oblong-lanceolate, acute, with narrowed but bluntish tips, smooth, folded but not keeled, the back of the palea with a longitudinal groove; stamens 3, the anthers linear-oblong, purplish, ca. 3 mm long.

Fruit: caryopsis cylindrical-oblong, ca. 2.5 mm long.

Distribution and Flowering Season:

moist to wet pineland savanna and hillside seep bogs, Coastal Plain, eastern North Carolina; Georgia in the Altamaha Grit region; flowering from September into October.

Special Identifying Features:

Of the perennial, tufted dropseeds frequenting the southeastern

Coastal Plain and having diffuse inflorescences there are but two with which this one could be confused, namely S. floridanus and S. curtisii. The former is a taller, coarser grass with leaves tending to be flat and much broader (to 5 mm) and having subequal glumes; the latter, while it has narrow leaves that tend sometimes to be involute, has darker colored spikelets whose erect, short peduncles tend to be nearly appressed to the panicle branches; it too has subequal glumes and spikelets that do not exceed 4 mm in length.

Habitat and Management Implication:

S. teretifolius frequents moist or even wet pinelands, its dense tufts with bases set fairly deeply in a black sandy peat. It is part of a grass-sedge bog type that includes such associates as Andropogon, Aristida, Panicum, Paspalum, Ctenium, many Rhynchospora, Scleria, Fimbristylis, Dichromena latifolia, bog Eleocharis and Carex, Juncus, particularly J. canadensis, J. trigonocarpus, Eriocaulon, Lachnocaulon, Syngonanthus, many Xyris, Habenaria, Lilium catesbaei, Zygadenus, Sabatia, many Polygala, Lobelia, Oxypolis rigidior and O. filiformis, Eryngium integrifolium, and a wealth of showy composites in Coreopsis, Liatris, Helianthus, Balduina, Bigelowia, etc. The overstory is usually dominated by Longleaf Pine, with scattered Pond Cypress, Pond Pine, Virginia Bay, Red Bay, Red Maple, Nyssa biflora (N. ogeche in Georgia), etc. The shrub layer is made up of gallberry, Wild Azalea, various blueberry and huckleberry, Staggerbush, Fetterbush, Sweet Pepperbush, Zenobia. Cyrilla forms broad belts in the lower areas and in Georgia there may be large patches of Serenoa. Smilax, particularly S. laurifolia, and various Rubus, together with Arundinaria form dense growths locally. Frequent natural woods fires were paramount historically in establishing the openings dominated by grass-sedge, in that they reduced the shrub and tree competition; conversely, fire protection results in increase of woody vegetation, this ultimately replacing the herbs.

The greatest threat to S. teretifolius habitat comes from grand-scale pine monoculture with huge tracts of low savanna being first drained, then mechanically site-prepared for Slash Pine. The result is a drier, ultimately shadier site which will not support this grass. Other tracts are being drained and cleared either for improved pasture or for row crop agriculture.

References:

- Harper, R.M. 1906. Sporobolus teretifolius Harper in Bull. Torr. Bot. Club 33: 229.
- Hitchcock, A.S. 1950. Manual of the grasses of the United States, ed. 2, revised by Agnes Chase: U.S.D.A. Misc. Publ. 200: Sporobolus, pp. 413-432.

SPECIES: Sporobolus teretifolius R.M.Harper

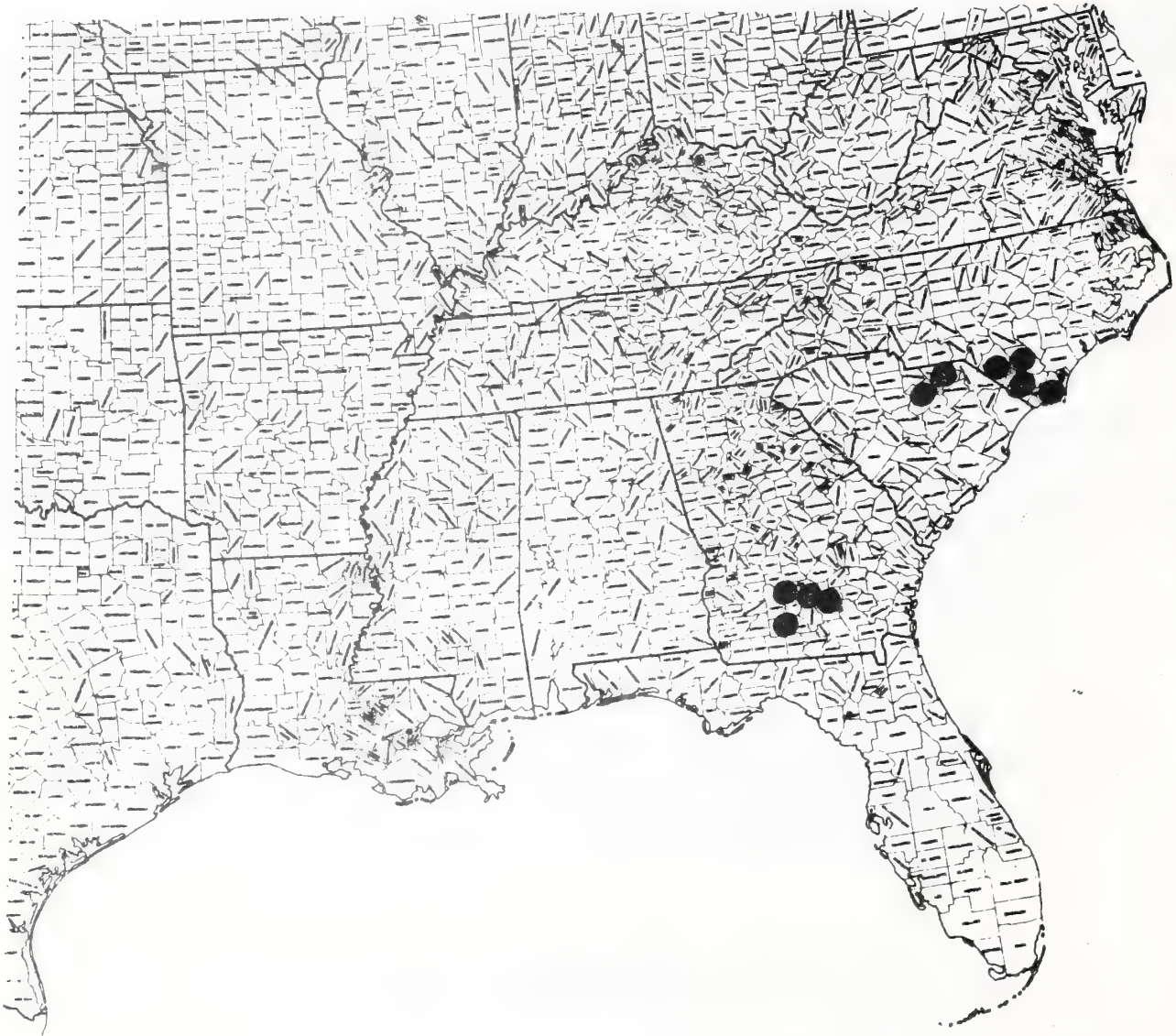
Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X		X			X	
Damage			X					X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Do not drain site!

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Known Distribution of:

Sporobolus teretifolius Harper



POLEMONIACEAE

Phlox bifida Beck ssp. stellaria (Gray) Wherry

P. stellaria Gray

P. bifida var. cedaria Brand

P. bifida var. stellaria (Gray) Wherry

Status: Threatened

Technical Description:

Mat-forming subshrub spreading and rooting from prostrate older shoots, the roots shallow, diffuse-fibrous, save at plant center where deeper, thick and woody, the foliage overwintering.

Stems: several from a root cluster, the older spreading low in all directions, slender, lax, the bases usually prostrate, often rooting at lower nodes, some sterile, functioning as stolons, with internodes crowded and leafy at tips which arch downward to root and form overwintering rosettes, others bolting directly from such rosettes and from nodes of procumbent branches, erect or nearly so, few-noded, mostly 10-15 cm high, slender, floriferous at tip, terete, scattered-short-pilose with whitish hairs, otherwise pale green or tinged with red or pink.

Leaves: opposite, estipulate, those of shoot buds or lowermost on new shoots scale-like, those upward on stems sessile, spreading or erect, often with axillary shoots and thus appearing fascicled, lance-linear, linear, elliptic-linear, (1-) 2-4 (-6) cm long, mostly 1-3 mm wide, the longer ones shorter or longer than the internode subtended, gradually shortening into inflorescence leaves, these usually 1 cm or less long, all narrowly acute, also mucronate or short-spinulose-tipped, the margin entire, sparsely to evenly ciliate or ciliate only proximally, flattish to somewhat revolute, the upper surface gray-green, smooth or sparsely pilose, the lower surface paler, smooth or pilose, particularly along the single, strongly raised vein.

Inflorescence: Numerous branches arising from a mat to form a mass of erect, few-noded stems, each terminating in a few-to-several-flowered cyme, the cyme branches arising from the upper leafy nodes, terminating in a single flower or in cymules of 3, the pedicels slightly shorter or longer than the flowering calyces, erect or arching upward, slender, purplish or reddish-tinged, smooth or with a scattering of minute, spreading, peg-like hairs.

Flowers: Perfect, regular; sepals 5, at anthesis mostly 6-8 cm long, fused, externally smooth or sparsely pilose, the tube tubular, 5-nerved, each nerve bordered by a firm green or reddish-green zone and each bordered nerve alternating with a scarious pale blue or purplish membrane, the calyx lobes narrowly triangular-subulate

ca. 3 mm long, erect or with slightly spreading tips, reddish-green, entire, scarious-bordered below the middle to the membranous, acutish sinus; petals 5, the corolla salverform, from base to narrow mouth 10-15 mm long, the tube very pale blue with tints of yellow, dilating gradually to the tip, the 5 lobes 10-12 mm long, spreading, pale blue, narrowly obovate and deeply split into 2 narrowish lobes to form a short-based "Y", externally and internally smooth; stamens 5, epipetalous, set at different levels at about middle of corolla tube, the yellowish oblong anthers ca. 1.0-1.5 mm long, erect, basifixed, sagittate; ovary superior, smooth, greenish, the slender terminal style producing 3, short-linear, erect, glandular stigmas at or slightly above the level of the anthers. Fruit: Capsule thin-walled, trilocular, broadly ellipsoidal or obovoid, held within the persistent, ascending-lobed calyx, and about as long as the calyx tube; seeds oblong, usually 1/locule, pale brown, smooth.

Distribution and Flowering Season:

Calcareous barrens, cliffs, open sandy or gravelly slopes, southern tips of Illinois and Indiana southward, very locally, through Kentucky into northern and central middle Tennessee; flowering from late April into June.

Special Identifying Features:

There are several Phlox that are matted subshrubs with needle-like leaves and which produce low masses of bloom. Most are referred to as "Moss-phlox" and several are cultivated. The one commonly grown in the east, according to Wherry (1955) is P. subulata; this has flowering shoots with closer nodes, shorter, more subulate-tipped leaves, thus is much more densely, compactly leafy; while its petals are notched apically, the notch is shallower, at most a long-based "Y" rather than the near "V" of P. bifida, and its corolla limb has a definite, deeper toned "eye". This is the only Moss-phlox to overlap at all the range of P. bifida stellaria. P. bifida stellaria is distinguished from P. bifida bifida in that it has sepals united more than half-way (rather than half-way), the calyx is externally smooth or sparsely hairy (rather than glandular-hairy), the petal notch is slightly shallower. P. bifida proper is found in rocky open areas or open woodlands, sandhills, northward in the Central Lowlands or to the west in the Interior Highlands provinces, and does not contact P. bifida stellaria except at the southwest corner of the range. The taxonomy here is difficult and questionable, and perhaps should be more conservative.

Habitat and Management Implication:

My comments here are confined to observations of Tennessee populations only. These appear to be scattered in a few counties of middle Tennessee, though the plant may be an aspect dominant, forming extensive masses of pale blue by early May. These are limestone

appearing either in full sun or in open stands of Juniper or Juniper mixed with upland hardwoods. Climax forest is usually a mixture of Shumard Oak, White Oak, Yellow Oak, Black Walnut, Persimmon, Carolina Hickory, Shagbark Hickory, Bitternut Hickory, Elm, Sassafras, Hackberry and Sugarberry, White Ash, Blue Ash, Sugar Maple and an occasional Beech; disclimax forest is Juniper. Understory shrubs or shrubs of more open areas include Rhus aromatica, Rhamnus caroliniana, Symphoricarpos, with shrubby growth of Cercis, Rhus glabra, R. typhina. Opuntia and Agave are common.

The soil of the open glades is thin, heavy, overlies flat-bedded limestone, usually contains a rubble of limestone chips. It produces a fine array of associated herbaceous species such as Hypoxis hirsuta, Allium (Nothoscordium), Ranunculus fascicularis, Delphinium virescens, Leavenworthia, Petalostemon gattingeri, Psoralea subacaulis, Astragalus tennesseensis, Oenothera triloba, Scutellaria parvula, Blephilia ciliata, Satureja glabella, Lithospermum canescens, Onosmodium molle, etc., many of which are endemic to such glades.

The Phlox is part of a successional stage leading to occupation by shrubs and Juniperus, finally to mixed-mesophytic forest climax, thus it disappears as the open glades close. The main threat to this Phlox in Tennessee comes from urban, residential and industrial expansion, as well as from the damming up of the streams in its area (i.e. Percy Priest Lake, which has flooded the bulk of the best Tennessee populations!).

References:

- Small, J.K. 1933. Manual of the southeastern flora, pp. 1101-1105.
- Wherry, E.T. 1955. The genus Phlox. Morris Arboretum Monographs III: 174 pp. Lancaster, Pa.

SPECIES: Phlox bifida Beck ssp. stellaria (Gray) Wherry

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		NA	NA	NA			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Range of:

Phlox bifida Beck ssp. stellaria (Gray) Wherry



THE UNIVERSITY OF CHICAGO

DEPARTMENT OF CHEMISTRY

1954

RESEARCH REPORT

1954

1954

1954

1954

1954

1954

PORTULACACEAE

Talinum calcaricum Ware

Status: Threatened

Technical Description:

Succulent, smooth perennial from a stout, fleshy, knobbly, elongate to compressed, simple or branched, erect or spreading-ascending-branched caudex, its crown often bearing the fibres of old, persistent leaf fibres, its base fibrous-rooted.

Stems: subterranean or surficial part as described above, the leafy shoots arising singly, oppositely or alternately, simple or forking or alternately branched from the caudex, stiffly erect or ascending, pale green suffused with pink or red, 3-6 (-10) cm long, the nodes close-set and spirally arranged.

Leaves: linear, terete, 3-5 cm long, apically narrowly conic and callused, basally clasping like a suction cup, gray-green or deep green suffused with some reddish pigment, ascending and approximate, usually rather dense.

Inflorescence: Peduncle slender, terminal, erect or ascending, 5-15 cm long, pale green with tints of pink or red, simple and bractless below, branching only in the upper ca. 1/5, there forming a cyme of few-to-many showy flowers, the slender but stiffish pedicels often maroon, 50 1.5 cm long, each subtended by a connate-perfoliate, bilobed, thin, bract, this whitish, each lobe more or less triangular, at most 3 mm long, short-cuspidate.

Flowers: regular, bisexual; sepals 2, distinct, thin (scarious) pale, broadly ovate to suborbicular, entire, ca. 3 mm long, persisting on fruit; petals 5, distinct, unfolding in afternoon, then spreading, a deep, bright rose, narrowly obovate, ca. 1 cm long, apically rounded, sometimes mucronulate, entire, cuneate-based; stamens numerous, somewhat variable in length but up to 5 mm long, the filaments filiform, reddish, the anthers basifixed, oblong, ca. 1.0 mm long, yellow; ovary superior, usually tricarpellate, with ovules many, free-central, the ovary body ovoid to broadly ellipsoidal, ca. 2.5 mm high, the style filiform, exerted beyond the longest of the stamens, there trilobed and papillate-stigmatose.

Fruit: Capsule ovoid to obovoid, 4-6 mm long, yellowish-green, opening by 3 subequal valves, subtended and clasped by the 2, erect and persistent sepals; seeds dull gray, round but laterally compressed, ca. 1 mm wide.

Distribution and Flowering Season:

Nashville Basin and calcareous lowlands of middle Tennessee and northern Alabama respectively; open limestone glades or limey clearings, locally abundant; flowering from early June through August.

Special Identifying Features:

Southeastern Talinum are more easily recognized to genus than as species, this being the case usually where genera are as distinctive as this one. However, of the 4 known southeastern species, T. appalachianum has the least stamens (usually but 5); T. teretifolium

has a style shorter than the stamens, or rather its style is not exerted. The only similar species as to stylar character is T. mengesii, and T. calcaricum differs from it by having fewer seeds (10-25, rather than more than 25), grayish and dull seed coat (rather than nearly black and lustrous), a definitely trilobate stylar apex and stigma (rather than capitate or nearly so), an ovoid to obovoid (rather than subglobose) capsule. While habitat differences are risky to use with many groups, that is not the case here, in that, unlike other southeastern Talinum, T. calcaricum is as the name suggests, a calciphilic species.

Habitat and Management Implications:

T. calcaricum is a species of open limestone glades, sharing the thin outcrop soils with Nostoc, various lichens and mosses, annual Panicum and Sporobolus, Cyperus, Juncus, Allium, Commelina, Arenaria, Sedum, various Leavenworthia, Delphinium virescens, Psoralea subacaulis, Petalostemon gattingeri, Scutellaria parvula, Satureja glabella, S. arkansana, Verbena, and many composites. All these are rooted in the thin, inwash or outwash detrital soils over limestones of Ordovician age, or on the clayey soils that accumulate around the outcrops. All might be considered pioneer invaders of such outcrops, giving way to increasing numbers of woody plants, usually first to junipers, which in turn are succeeded by mixed hardwoods predominated by oaks, hickories and hackberries with ash, elm, hard maples. The rocky clearings were maintained or created historically by fire and/or erosive forces, perhaps occasionally by severe storms such as the tornadoes that periodically strip lanes through some of these areas today.

The greatest current risk to these habitats today comes from urban expansion and the need for more and more industrial and residential space, together with a more pastoral hazard involving conversion of some open glades to low-quality pasture. This last damages or destroys the plants, in that the stock trample them or compact the thin soils.

References:

Small, J.K. 1933. Manual of the southeastern flora, pp. 493-494.

Ware, Stewart. 1967. A new Talinum (Portulacaceae) from the cedar glades of middle Tennessee. Rhodora 69 (780): 466-475.

_____. 1969. Seed germination in cedar glade Talinum.
Ecology 50 (1): 137-140.

SPECIES: Galium calcaricum Ware

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy	X				X	X		
Damage		NA	NA	NA			NA	
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Distribution of:

Talinum calcaricum S. Ware



PORTULACACEAE

Talinum mengesii W. Wolf

Status: Threatened

Technical Description:

Succulent, smooth perennial from a fleshy, stout, knobby, elongate, terete to compressed, simple or branched, erect or spreading-ascending-branched caudex, the crown often bearing old leaf base fibres; roots slender, fibrous.

Stems: aerial part of caudex simple or stiffly alternately or oppositely branched, or branches several from the apex, densely leaty, erect or ascending, pale green suffused with red or pink, mostly 5-15 cm high, terete, thickish.

Leaves: close-set and spirally arranged on the main stem and branches, particularly toward shoot bases, ascending, linear, to 6 cm long, 3 mm thick, terete, deep green, sharply conical apically, the bases attaching suctioncup-like, bearing internally just above the attachment a thin, ligule-like pair of stipules.

Inflorescence: Peduncles bractless, arising apically from main axis and branches, mostly 1-2 dm long, slender, terete, stiffish and wirelike, producing an open cyme of few-to-many flowers, usually this scorpioid, with an average of 3 primary branches, the stiffish, pedicels arising from inner side, subtended by scarious, lance-linear or subulate, connate-perfoliate-based bracteoles and to 1 cm long.

Flowers: showy, regular, bisexual; sepals 2, distinct, broadly to narrowly ovate, thin, 4-5 mm long, pale green tinged with pink or maroon, early deciduous from fruit; petals 5, distinct, spreading, opening in afternoon, elliptic to narrowly obovate, a bright rose-pink, ca. 1.5 cm long, apically rounded, entire, cuneate-based; stamens 40-100, distinct, the filaments filiform from short-scarious bases, somewhat unequal, but up to 5 mm long, the anthers short-oblong, basifixed, 0.5-0.8 mm long, bright yellow; ovary superior, tricarpellate, the numerous ovules free-central but concentrated toward apex of columella, the style well exerted beyond the longer stamens, linear, unbranched, the stigma capitate, 3-lobed, not branched.

Fruit: Capsule subglobose or very broadly ovoid, yellow-green, when ripe 5-6 mm high, 3-valved; seeds numerous, laterally flattened, round in outline but concave on the sides at center of coiled embryo, ca. 1 mm wide, nearly black, shining.

Distribution and Flowering Season:

Granite and sandrock outcrops, Cumberland Plateau, Ridge and Valley, Blue Ridge, and Piedmont, southern Middle Tennessee south into Piedmont Georgia and Alabama; flowering from late June through August, intermittently to frost.

Special Identifying Features:

As Wolf (1920) and Ware (1967, 1969) have noted, it was thought for years that there was but one terete and linear-leaved flameflower in the southeastern U.S. east of the Mississippi, and that was called T. teretifolium. Wolf discovered two more in Alabama (1920 et al), and Ware a third (1967). T. mengesii Wolf stands out from all these in its larger flowers, in having more stamens (40-100),

and in having the longest style exertion (often half again longer than the filaments). The style apex in this species is lobeless, only the capitate stigma being lobed. Nearest it in flower size and overlapping in stamen number and stylar character is T. calcaricum Ware, but this species is a calciphile, its sepals persist on the fruit, its seeds at maturity are grayish, dull, rather than nearly black and lustrous. Of the characters used by Wolf and Ware, stylar length appears to be the most troublesome and variable, in that in T. mengesii the style may in some cases so short as barely to be exerted, thus in this regard overlapping T. calcaricum. (It is suggested that flowers of each species be pressed in the field so as best to preserve the most critical characters; many collections have not been made this way, and are virtually useless for critical comparison!)

Habitat and Management Implication:

T. mengesii is locally abundant on and around acidic rock outcrops such as granites and sandstones. These outcrops, where soil can accumulate to depths to support forest, produce an oak-hickory-pine type, the oaks being mostly upland species (except where streams cut through) such as Quercus falcata, Q. coccinea, Q. marilandica, Q. stellata, Q. margaretta, Q. rubra, Q. prinus, sometimes in the Piedmont Q. georgiana, the hickories mostly Carya glabra, C. pallida, C. tomentosa, the pines being mostly P. virginiana, P. echinata, P. taeda (rarely P. palustris). Understory trees and shrubs are commonly Cornus florida, Chionanthus, Kalmia, Oxydendrum, Vaccinium (high and low bush), Rhus; Smilax and poison-ivy, Gelsemium, Anisostichus, Parthenocissus, Vitis, Lonicera abound. Herbaceous associates are typical of perennial and annual pioneers of granite and sandstone, such as, bryophytes, lichens, Selaginella, Panicum, Agrostis, Andropogon, Digitaria, Sporobolus, Bulbostylis, Fimbristylis, Juncus, Allium, Polygonum tenue, Crotonopsis, Hypericum gentianoides, Oenothera, Liatris microcephala, Coreopsis, many Aster, Solidago, Viguiera (in Piedmont and Blue Ridge), etc. The Talinum is found in full sun or light shade, roots in cracks in rock or in areas such as shallow drying pools on the rock or around it, anyplace where shallow inwash or outwash accumulates in full sun. As soil depth increases and as woody plants move in, the herbaceous plants lose ground, are finally eliminated. As in the case of other granite and sandstone glade plants the openings are maintained through fire or erosion, closed through invasion by trees, shrubs and shade tolerant perennials. This habitat is damaged or destroyed by quarrying of the rock, by development of outcrop areas for residential, recreational or industrial use. Logging of the rather low quality forest on or around such glades may have comparatively light impact. Conversion of outcrop areas to pasture has a negative effect, in that livestock tend to trample and crop the plants around the temporary pools. The same trampling effect can be gotten in some parks, when hiking or motorized vehicles are allowed on the sensitive areas.

References:

Small, J.K. 1933. Manual of the southeastern flora, pp. 493-494.

Ware, Stewart. 1969. On the ecology of Talinum mengesii (Portulacaceae).
Bull. Torr. Bot. Club 96 (1): 4-10.

Wolf, W. 1920. Notes on Alabama plants. Am. Midl. Nat. 6 (8): 151-155.

SPECIES: Talinum mengesii W. Wolf

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		NA	NA	NA			NA	
Damage								X
No Lasting Effect	X							
Beneficial if Done Properly					X	X		

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Known Range of:

Talinum mengesii W. Wolf



PRIMULACEAE

Lysimachia asperuliaefolia Poirett

Status: Endangered

Technical Description:

Perennial clonalizing herb from a moderately deepset, horizontal, fleshy, terete rhizome, this elongate, ca. 5 mm thick, pinkish, the numerous nodes producing opposite, low-triangular scales as well as diffuse-fibrous roots.

Stems: erect, stiffish, terete, smoothish, mostly 3-6 dm tall, unbranched below the inflorescence, the lowest nodes approximate, the internodes progressively lengthening up the stem, below with flesh-pink tones and finely ribbed, upwardly becoming pale yellow-green and ribless, proximally smooth, distally and in inflorescence minutely stipitate-glandular, the glands reddish.

Leaves: lowermost leaves erect, scaley, mostly narrowly triangular, firm, brownish, 1 cm or less long, in whorls of 3, increasing in length gradually up to mid-stem or above, where largest, in whorls of 4, spreading, sessile or subsessile, narrowly to broadly lanceolate, 2-5 cm long, 8-20 mm wide, acute or acuminate, entire or slightly revolute, broadest at the rounded base, the upper surface deep yellow-green, smooth, lustrous, minutely glandular-punctate, impressed veiney, the main veins subparallel, palmate-arcuate, with at least 1 strong pair of laterals, the lower surface much paler with the glandular punctations darker by contrast, smooth, the veins, particularly the midrib, strongly raised, the uppermost leaves abruptly smaller in the inflorescence, usually minutely stipitate-glandular, particularly on the veins beneath.

Inflorescence: a compact to somewhat loose, indeterminate, terminal cylindrical raceme 3-8 cm long of several whorls of bracts each subtending a whorl of as many pedicels, these spreading or ascending, slender, straight, at anthesis mostly 8-10 mm long, pale green, stipitate-glandular-puberulent.

Flowers: bisexual, regular, showy; sepals spreading, narrowly triangular, to 5 mm long, green strongly dotted with large red glands, narrowly acute, apically ciliate with stipitate glands, parallel-nerved, the surfaces smooth; petals 5, joined only at very base into a short, broad tube, the spreading lobes mostly oblanceolate or spatulate, ca. 1 cm long, broadly acute, the margin apically erose or ragged, the lower margin entire, the base cuneate, the marginal area on both sides stipitate-glandular with yellow glands, the surface a bright, deep butter yellow, medially with a zone of small reddish-orange, lens-shaped mottlings (glands); stamens 5, epipetalous toward petal tube base, the filaments attached opposite corolla lobes, forming a low yellow corona ca. 2 mm high, its external surface pebbled with sessile yellow glands, the free filament pale yellowish, tapering-linear, 3.0-3.5 mm long, erect, stipitate-yellow-glandular, the anthers lanceolate, ca. 1.5 mm long, orange-yellow, basifixed, erect, the 2 locules somewhat divergent at base; ovary superior, greenish, concealed in the staminal tube, the style elongate, narrowly lineal, tapering gradually into the simple short stigma.

Fruit: a broadly ovoid or subglobose capsule ca. 4.5 mm high, externally smooth, straw-colored, with red mottlings, the slender erect style persisting, stipitate-glandular.

Distribution and Flowering Season:

Sandy moist peat of pine flatwoods savanna and seep bogs in sandhills, very rare and local in the Coastal Plain of the Carolinas; flowering in May and June.

Special Identifying Features:

Of those southeastern Lysimachia with whorled leaves and terminal, racemose inflorescences there is but one other with which L. asperulaefolia might be confused, namely L. loomisii. The two are often found together. However, L. loomisii has narrower leaves, these rarely reaching 8 mm in width, which lack the small stipitate glands found on leaves and bracts of L. asperulaefolia, and which have a stronger taper at the base (those of L. asperulaefolia are broadest near the very rounded base!). The flowers of L. asperulaefolia are appreciably larger, with more glands on sepals and both sides of petals, these not evident or as evident in L. loomisii.

Habitat and Management Implication:

This is a genuinely rare and local plant, undoubtedly endangered. It normally roots in high hydroperiod, black sandy peats such as are found either in seep bog pocosin or boggy flatwoods savanna. In varied proportion in the overstory are Pinus palustris, P. serotina, Taxodium ascendens, occasionally Chamaecyparis, mixed with such hardwoods as Nyssa biflora, Acer rubrum, Magnolia virginiana. The shrub layer is characterized by an abundance of Ilex glabra, I. coriacea, Myrica cerifera, M. heterophylla, Persea, Cyrilla, Clethra alnifolia, together with many sorts of ericads such as (percentages vary with locale) Kalmia angustifolia, many high and low-bush Vaccinium, Gaylussacia, Zenobia, Leiophyllum, several Rhododendron, particularly R. atlanticum, Lyonia, Leucothoe, etc. Sphagnum and other bog bryophytes carpet the ground.

Where fire has been of common occurrence, substantial clearings dominated by grass-sedge bog communities have developed and these are suited to the Lysimachia. Frequent associates are Lycopodium, Woodwardia virginica, Osmunda, Ctenium, various Paspalum and Panicum, Andropogon, Aristida, Carex, Rhynchospora, Scirpus, Dichromena latifolia, Xyris, Eriocaulon, Lachnocaulon, Zygadenus, Tofieldia, Aletris, Iris, Spiranthes, Pogonia, Cleistes, Sarracenia, Drosera, Dionaea, Psoralea psoralioides, various Polygala, Hypericum, Rhexia, Phlox, and bog asclepiads. Composites are many, but mostly not in flower, though Helenium, Coreopsis (falcata), Erigeron (annuus) may be present and showy.

As may be deduced from the above description of associates, L. asperulaefolia is then a plant of highly organic, high-hydroperiod, sands and has been maintained historically through creation of area for it by periodic woods fires. It may grow for a time in savanna that is being invaded by woody species, but is ultimately crowded out unless a new burn occurs. Similarly, it will not persist in dense stands of pines or hardwoods. The few remaining known populations would best be maintained by saving them from drainage, by removal of trees with minimal damage to substrate, by periodic controlled burns. Pine plantations preceded by drainage and mechanical site

preparation are definitely not the answer.

References:

Radford, A.E., H.E. Ahles & C. Ritchie Bell. 1968. Manual of the vascular flora of the Carolinas, pp. 819-823.

Small, J.K. 1933. Manual of the southeastern flora, pp. 1023-1024.

Approximate Distribution of:
Lysimachia asperuliaefolia Poirett



ROSACEAE

Agrimonia incisa T. & G.

Status: Threatened

Technical Description:

Solitary or in small clumps, perennial, the stems arising from a compact, small, tuberous-thickened caudex, increasing by imbricate-scaley lateral buds, the roots diffuse-fibrous, sometimes tuberiferous.

Stems: erect or ascending, simple or few-branched, but usually wand-like, mostly 5-10 dm tall, at base above thickened rootstock ca. 3-4 mm thick, terete, tapering gradually upward, hairy with 3 sorts of hairs, namely scattered-hirsute, incurved-puberulent and, particularly toward base, strigose, the nodes several, approximate toward base, more distant upward on stem.

Leaves: alternate, ascending or spreading, once-odd-pinnately compound, the largest to 1 dm long, strongly stipulate, the stipules foliaceous, broadly reniform, half-clasping the stem, strongly and saliently triangular-dentate; lowermost leaves mostly absent by flowering time, leaving only sheathes and stipules, those in lower 1/3 of stem largest, grading somewhat smaller up about halfway, then more or less abruptly reduced and distant, the inflorescence axis leafless; larger blades short-petiolate, interruptedly pinnate, the leaflets mostly opposite, sometimes staggered, the larger ones to ca. 2 cm long, the terminal slightly largest, all narrowly obovate or cuneiform, apically rounded or obtuse, strongly and saliently triangular-dentate or serrate, the tooth tips narrowly acute, often with a small tuft of long stiff hairs and somewhat recurved, the leaflet base usually broadly to narrowly cuneate, sessile, the smaller leaflets also sessile, less than 1/2 as long as the larger ones, variable in outline and fewer-toothed, the upper surfaces of leaves dark yellow-green, impressed-pinnate-veiney, soft puberulent, the lower surfaces paler, strongly raised-veiney, inconspicuously sessile-glandular, scattered-pubescent, also villose-tomentulose, the leaf rachis hairy as in stems.

Inflorescence: Racemes spikelike, rarely few-branched, usually simple, terminal, slender, the flowers numerous, the lowest, particularly in fruit, distant, but internodes shortening upward, each pedicel subtended by a small, chaffy-scaley, few-toothed, strigose and ciliate bract.

Flowers: Pedicels short, 1 mm long or less, jointed to and reflexed from an ascending, stiffish, apically cupuliform, scarious-bracted peduncle to ca. 3 mm long (shorter at anthesis), the peduncle and pedicel usually puberulent-villosulous; flowers perfect, regular, the hypanthium at anthesis broadly campanulate or turbinate, ca. 2 mm high, green, hairless, externally pebbled with round, translucent resin-droplets, rimmed apically by many suberect, stiff, yellowish uncinata (like fish hooks) bristles; sepals 5, at anthesis spreading, triangular - ovate, ca. 2 mm long, acute, green, glabrous, the backs gland-pebbled as in hypanthium; petals 5, short-clawed, spreading, ca. 3.0 mm long, elliptic or obovate, pale yellow; stamens mostly 5,

alternating with petals on hypanthial rim, the filaments pale yellow, smooth, erect, slender-tapering, ca. 2 mm long, terminating in a fleshy connective wider than long, the anther sacs lateral, narrowly reniform, the whole connecting with the filament to form a broad-headed "T"; ovary mostly inferior, at apex nearly even with hypanthial rim, there forming a fleshy disc concave in the middle from which arise 2 (-3) distinct, erect or slightly divergent, short-linear styles. Fruit: a pair of planoconvex nutlets ca. 2.0-2.5 mm long, the pericarp pale brown, parchmentlike, incased in the hypanthium, this by fruiting time broadly turbinate-obovoid, ca. 2.5-3.0 mm long, the base attenuate, the rim with inwardly hooked stiffish bristles 2.0-2.5 mm long and capped by the persistent green convergent sepals which make a cone above the fruiting styles.

Distribution and Flowering Season:

Sandy open woodlands, dryish ravine heads, bluffs and small clearings, Coastal Plain, North Carolina south to northern Florida and west into southern Mississippi; flowering in August and September.

Special Identifying Features:

This Agrimony is distinguished from the others by a combination of characters such as the small leaflets, even the terminal one at most barely exceeding 2 cm and the leaflet margins which are very coarsely and saliently few-toothed.

Habitat and Management Implication:

A. incisa is infrequent in sandy, usually upland woods in the Lower Coastal Plain. It appears to be always a part of the Longleaf Pine-deciduous scrub oak type, is rooted in deep dryish sands or sandy loams, usually with the overstory an open stand. Occasionally it will be in shade of open stands of more mesic character (i.e. Beech-Maple-Magnolia) but only in the ecotonal sense. Its herbaceous associates are almost consistently those typical of dry sandy sites, and include *Aristida* (mostly *A. purpurascens*, *A. lanosa*), *Andropogon*, *Panicum*, *Gymnopogon*, *Erianthus*, *Paspalum*, *Triplasis*, *Triodia* (*flava*, *caroliniana*), *Digitaria*, *Leptoloma*, *Cenchrus*, *Cyperus retrorsus*, *C. plukenetii*, *Rhynchospora grayii*, *Paronychia*, *Polgonella*, *Dicerandra*, several *Euphorbia*, *Stillingia*, *Cnidioscolus*, *Croton argyranthemus*, *C. glandulosus*, many *Desmodium* and *Lespedeza*, *Stylosanthes* and very many species of composites in *Liatris*, (particularly *L. gracilis*, *L. tenuifolia*, *L. graminifolia*), *Heterotheca* (especially *H. trichophylla*, *H. gossypina*, *H. graminifolia*, *H. adenolepis*), *Solidago* (*S. odora*, *S. tortifolia*, *S. petiolaris*, *S. arguta*), *Vernonia* (particularly *V. angustifolia*) *Silphium* (*S. asteriscus*, *S. compositum*), *Kuhnia*, *Aster* (*A. concolor*, *A. linariifolia*, *A. patens*, etc.). All these are suggestive of the droughtyness and fire susceptibility of such sites. The shrub layer is made up of many *Vaccinium*, *Gaylussacia*, *Opuntia*, *Poison Oak*, *Winged Sumac*, *Ceanothus*, *Ilex ambigua*, *Rubus cuneifolius*, various *Smilax*, *Crataegus uniflora*, *Prunus umbellata* and other shrubs of dry woodlands.

This particular species has become, or seems to be, very local

in that much of the original Longleaf pineland has been replaced by plantation pineland. It does not appear readily to move into mechanically disturbed sites. It is a fire successional species, like many other pineland herbs increasing as a result of competition being reduced by natural woods fires.

References:

Radford, A.E.H.E. Ahles & C. Ritchie Bell. 1968. Manual of the vascular flora of the Carolinas, pp. 455-457.

Small, J.K. 1933. Manual of the southeastern flora, pp. 615-616.

SPECIES: Agrimonia incisa T. & G.

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X		X			X	
Damage			X					X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Estimated Range of:
Agrimonia incisa T. & G.



RUBIACEAE

Houstonia montana (Chickering) Small

Hedyotis purpurea (L.) Hook. var. montana (Chick.) Fosb.

Status: Endangered

Technical Description:

Perennial, low, forming loose tufts by short, ascending leafy lateral shoots which overwinter and by slender, forking, superficial rhizomes, the roots shallow, diffuse-fibrous.

Stems: very slender, but stiffish, the bases decumbent, often rooting at lower nodes, erect or spreading above, mostly 1.0-1.5 dm long (-2.0 dm), some strict, some few-branched, branching from mid and upper nodes and fertile, some sterile, bearing only leaves; main axis ca. 1 mm thick, subquadrate, the angles narrowly winged or sharp, smooth, deep green or tinged with purple, the nodes close proximally, few and well separate at mid-stem, close in the inflorescence.

Leaves: opposite, decussate, stipulate, the stipules scarious, triangular, the blades mostly elliptical, narrowly ovate or broadly lanceolate, firm, spreading, sessile or short-petiolate, the larger blades 1.5-2.0 cm long, apically narrowly rounded, obtuse or broadly acute, the margins entire, minutely ciliate-scabrid, the base rounded or cuneate, then abruptly attenuate (lowermost leaves much smaller, mostly spatulate, mostly withered by anthesis).

Upper bracteal leaves usually not much reduced and often partly concealing the inflorescences. Surface above deep green, papillate, only the midnerve evident, the lower surface smooth, pale green.

Inflorescence: terminal, either a single 3-flowered subsessile cyme or with the lateral branches terminating in similar cymes, in any case few-flowered, and the the inflorescence base often concealed by bracteal leaves.

Flowers: bisexual, regular, the sepals 5, united at base to form a campanulate tube ca. 1.5 mm high, the ascending lobes oblong, ca. 2.0-2.5 mm long, acute, entire, the surface pale green; corolla 5-parted, salverform, a lively pale but bright purple, the narrowly funnelform throat to 8 mm long, the slightly spreading limb with lobes triangular, ca. 5 mm long, the surface externally smooth, internally with lobes pilosulous with small, pale, soft, short, sharp-tipped or claviform purple-tipped hairs, the tube simply pale-pilosulous; stamens 5, alternating with the corolla lobes, epipetalous, the purplish slender filaments arising just under the lobe sinuses and arching slightly inward, 0.5-0.7 mm long, the anthers linear-excurved, extrorse, ca. 1 mm long, pale blue; ovary bicarpellate, half-inferior, smooth, the slender terminal style reaching barely midway up the corolla tube, its stigma capitate, papillose.

Fruit: capsule very broadly obovoid, nearly as wide as long, slightly compressed, bilobate, emarginate, ca. 3 mm high, about 2/3 covered by the tube of the persisting calyx, the cyme and fruit stalks somewhat elongating as fruit matures; seeds numerous, axile, irregularly blocky-angulate, pebbled, nearly black.

Distribution and Flowering Season:

Moist granitic summit elevations, cliffs and bluffs, Blue Ridge, Roan Mountain, North Carolina (and Tennessee?); flowering mostly in July and early August.

Special Identifying Features:

Conventional treatments of this genus whether it be called Houstonia or Hedyotis have H. montana as a variety of H. purpurea. Yet, though it is true that H. purpurea is polymorphic, H. montana is so distinctive as to cause any observer who has much familiarity with the range of variation of H. purpurea to reconsider the taxonomy. H. purpurea in all its forms is taller, has either longer or broader leaves (or both!), has a much more floriferous inflorescence and much smaller flowers (corollas rarely much over 7 mm long), the sepals of which are narrower. H. purpurea proper is often found at high elevations in the Blue Ridge, even around some high balds, and yet retains characters distinct from the Roan Mountain endemic.

Habitat and Management Implications:

H. montana is indeed a very rare herb! It is presently known only from the North Carolina side of Roan Mountain and is scarce there. The ideal habitat appears to be a moss-sedge-grass mantle that carpets a thin, moist to wettish, black humified fine sand over outcrops of granitic rock, steep slopes and bluff ledges, or the rocky detritus around outcrops. Its herbaceous associates are mostly high mountain carices and grasses, with Houstonia serpyllifolia, Potentilla tridentata, Saxifraga michauxii, Heuchera villosa, Geum radiatum, Gentiana, sometimes the rare Solidago spithamea, and various ferns and fern allies. Sometimes it may be found in areas of grass bald where Alnus, Rhododendron, Leiophyllum and other heaths are invading, and doubtlessly it then gives way to shade and root competition. The best chance of finding it is to pick one's way along the narrow ledges of steep, moist bluffs along the spruce-fir summit ridges. In such places it has its least danger of being trampled by hikers or swamped by invading woody vegetation. Factors for its continuance are much the same as for Geum radiatum. It needs small, cool, moist cleared areas. Where these are too level or have deeper soil layer, successional pressure is toward woody invaders unless some factor such as clearing or burning maintains the openings. Where the country is steepest, it may be lost through rockslide or slipping of soil mantles, but these forces also create new area for it to occupy. Fortunately the known small populations are on public parkland, and some are harboring in areas too steep or risky for most people to tread.

References:

Fosberg, R. 1954. Notes on plants of the eastern United States. Castanea 19: 25-37.

Small, J.K. 1903. Flora of the southeastern United States, 1325, 1338.
 _____ 1933. Manual of the southeastern flora, pp. 1253-1256.

SPECIES: Houstonia montana (Chickering) Small

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy								
Damage		NA	NA	NA			NA	
No Lasting Effect								
Beneficial if Done Properly					X	X		

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Houstonia montana (Chickering) Small



SCROPHULARIACEAE

Agalinis pseudaphylla(Pennell) Pennell

Gerardia pseudaphylla Pennell

Agalinis oligophylla var. pseudaphylla (Pennell)Pennell

Status: Threatened

Technical Description:

Annual, root-parasitic, 4-7 dm tall, the shallow roots sparse, slender, fibrous.

Stems: erect or ascending, usually single from the rootstock, branching abundantly at or above middle to form a broad crown of arching, ascending to spreading, elongate, slender but brittle branches, the main axis subterete, decurrently low-wire-ridged below the scattered nodes, dull green, papillose, the slender, usually opposite, branches arching upward or outward, often purple-tinged, prominently ribbed and grooved, the ribs scabrid.

Leaves: acicular, small, the largest usually 5 mm or less long, spreading-ascending, fleshy, alternate, less often subopposite, mostly distant along stem (the lowest absent by anthesis), in inflorescence branches becoming very short and in cross section angulate, the surfaces dull green, scabrid.

Inflorescence: a compound of racemes, these developing flowers and/or branchlets mostly in the distal 1/2, the flowers several-to-many either on simple short pedicels or short, few-flowered branchlets, each pedicel or branchlet subtended by a single ascending or erect bractlet 3 mm long or shorter.

Flowers: bisexual, the calyx regular, the corolla slightly irregular, the pedicels slender, stiffly spreading, ascending, mostly 3-5 mm long (be sure to check "longer" pedicels as these may, by jointing, show that they are actually short branches!), often reddish-tinged, smooth, teretish or slightly angulate; calyx broadly campanulate, at anthesis ca. 2.5 mm high, thin, faintly veiney, the rim entire, subscarious, bearing externally just below its edge 5, equidistant, callus-like, bristly scabrid, narrow and low-conical teeth, these 0.2 mm long or less; corolla showy, from base to tip of lower lobes ca. 2 cm long, the short tube flaring abruptly to the funnelform throat, the throat rim oblique (throat longer on the lower side), the limb ca. 2 cm across, the 5 lobes suborbicular or broader than long, broadly rounded or apically somewhat truncated, erose, ciliate, equally spreading but on an oblique plane, the external surface pale pink, smooth, grading downward to more yellow-tinged and minutely puberulent, internally with lobes pink, smooth, the throat from base of lobes downward becoming villous with long, slender purplish hairs and more yellowish, usually with 2 strong yellowish bands anteriorally (on lower side as flower is oriented); stamens 4, epipetalous, didynamous (2 pairs set at 2 different levels), the slender filaments filiform, slightly to shaggy-villous, purplish, the anthers suberect but dorsifixed, pale yellow, ca. 2 mm long, elliptic-oblong, shaggy-white villous on the backs, each locule horned at the base; ovary superior, narrowly ovoid, shorter than the calyx rim, bicarpellate, the slender style ca. 1 cm long, the 2 linear, erect stigmas ca. 1-3 mm long.

Fruit: Capsule at maturity subglobose, ca. 4.5 mm long, 1/2 or

less its length included by the persistent calyx, smooth, pale brown; seeds numerous, ca. 1 mm long, somewhat compressed, wedge-shaped, strongly reticulate with sharp, thin, raised ridges, a pale lustrous brown.

Distribution and Flowering Season:

Moist acidic pine flatwoods or savannas, hardwood flats, Coastal Plain and Interior Low Plateau, southern Mississippi, middle Alabama, the Highland Rim of middle Tennessee; flowering from September into October.

Special Identifying Features:

This is a difficult genus, as yet unsolved for the southeastern U.S. However, the only species in our area that combine a fairly tall stature with reduced, linear-acicular leaves and very small (callose) calyx lobes are A. microphylla, A. aphylla and A. pseudaphylla. The first has longer calyx lobes and 1/2 or more of its ripe capsule is enclosed by calyx tube. A. pseudaphylla and A. aphylla differ (perhaps only varietally!) in that the former has narrower and at the same time longer, more spreading leaves (3-6 mm versus 1-3 mm, narrowly linear-triangular versus scale-like) and longer pedicels (3-6 mm versus 1-3 mm).

Habitat and Management Implications:

Given that the same entity is involved throughout the stated range, the habitat of A. pseudaphylla includes a wide variety of site conditions. The problem is that one set of specimens has been gotten from Sumter County, Alabama, in what is known as blackbelt prairie, which in that area is a heavy clay overlying chalk and is probably at least circumneutral. On the other hand the type locality, near Biloxi, Mississippi, is, or was, presumably flatwoods-savanna, moist, sandy-peaty, and quite acidic. This last is the sort of situation found for plants in Tennessee referable to the species, even though Pennell (1935) did not indicate that the range of A. pseudaphylla includes Tennessee. The southern Mississippi populations are found in Longleaf Pine-Gallberry-Titi-Vaccinium formations where fire and other disturbance has created grass-sedge openings. The Tennessee localities are homogeneously "oak-barren", again savannalike, relatively level, underlain by hardpan and frequently quite moist. These places also have a history of fire, this increasing the spacing of trees, and allowing a grass-sedge assemblage to develop, this savanna having a lower Coastal Plain character but with no pines. Instead the overstory is largely oak-hickory, with the major species being Quercus phellos, Q. nigra, Q. falcata, Q. stellata, Q. alba, Carya tomentosa, C. glabra, Acer rubrum, Liquidambar, Liriodendron. The shrub cover is a mixture of Vaccinium (high and low bush), Rhododendron canescens, Dwarf Willow, Viburnum, Rhus, Spiraea tomentosa, Crataegus, Aronia, etc. The more open sites in which the Agalinis is local are, during its anthesis, Andropogon virginicus-A. elliotii-A. scoparius-A. glomeratus-A. gerardi-Sorghastrum nutans, Panicum virgatum-P. anceps-Chasmanthium laxum & sessiliflorum-Gymnopogon-Paspalum laeve-P. floridanum-Aristida-Carex glaucescens and other carices-Rhynchospora capitellata-R. corniculata-Pimbristylis puberula-Xyris torta-several orchids, particularly Spiranthes, Habenaria, Linum, many Polygala,

Hypericum stans, H. hypericoides, H. densiflorum, Rhexia, Asclepias hirtella, several Ludwigia, particularly L. hirtella, and a large number of composites including Silphium mohrii, S. terebinthinaceum, Helianthus angustifolius, Parthenium integrifolium, Vernonia, several Eupatorium, Liatris spicata, L. earlei, Bidens, Coreopsis tripteris, many Aster. Other Agalinis may be abundant, these mainly A. tenuifolia, A. obtusifolia, A. decemloba, A. purpurea, A. virgata. The greatest threat to middle Tennessee populations comes from clearing and draining of the oak barrens either for real estate or for improved pasture or row crop agriculture.

Habitat in the Gulf South is, in addition to having the problems mentioned above, much of it converted by way of drainage and mechanical site preparation for Slash Pine. Any mechanical site preparation involves radical disturbance of the grass-sedge system that this Agalinis is an integral part of. Protection of these areas from fire ultimately causes another problem, with shrubs and trees increasingly taking over.

References:

- Pennell, F.W. 1935. The Scrophulariaceae of eastern temperate North America. Acad. Nat. Sci. Phila. Monogr. 1: 453-456.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1216-1221.

SPECIES: Agalinis pseudaphylla (Pennell) Pennell

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X		X			X	
Damage			X					X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Drainage is a major problem!

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Distribution of:

Agalinis pseudaphylla (Pennell) Pennell



also resolution in the House of Representatives

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SCROPHULARIACEAE

Aureolaria patula (Chapm.) Pennell

Dasystema patula Chapm.

Gerardia patula (Chapm.) Gray

Status: Threatened

Technical Description:

Rather coarse perennial, root-parasitic, False-foxtail, from stout-branched, though shallow, roots.

Stems: erect to decumbent, usually several from rootstock in older plants and spreading out, leaning or prostrate as season advances, to 12 dm long, terete, with low ridges below petioles proximally, and dull green, distally sub-quadrate and tinged with red or maroon, sparsely puberulent, the branching sparse or absent below the inflorescence, within the inflorescence opposite and sometimes from every node.

Leaves: opposite, estipulate, the largest produced in tufts of rosettes in spring, these and lower stem leaves usually absent by anthesis, the largest persistent leaves lowest, to 2 dm long, the blades ovate or lance-ovate, strongly incised-pinnatifid, the deepest lobes lowest, themselves pinnately lobed or at least coarsely triangular-toothed, the base hastate or truncate or abruptly attenuated, forming a wing on most of the petiole, the surface above dull yellow-green, smooth except for a puberulence along the impressed midrib, the lower surface raised-reticulate, paler yellow-green, sparsely puberulent, particularly on the veins, the blades progressively shortening and shorter-petiolate upward on stem and branches, becoming mostly lanceolate, entire, serrate or serrulate, sessile in the inflorescence.

Inflorescence: a compound, oppositely branched system of racemes, the slender but stiffish pedicels mostly 1.2-2.5 cm long, densely to sparsely puberulent, usually reddish-tinted, arching upward, thus the flowers erect or spreading on the branch.

Flowers: bisexual, somewhat zygomorphic, showy, the sepals 5, united below into a campanulate tube 3-5 mm long, the lobes narrowly linear-triangular, subequal, slightly venose, 4-7 mm long, the whole surface externally puberulent, green, the inner face of the lobes puberulent; corolla butter-yellow, 3.0-3.5 cm long, the short tube expanding in funnel-form fashion, the lobes 5, somewhat spreading, suborbicular, the upper 2 slightly larger, ca. 1 cm long, the lower 3 slightly more spreading, all somewhat ciliate, the surface externally smooth, internally villous, particularly toward the base; fertile stamens 4, didynamous, attached near corolla base, the longer pair ca. 2 cm long, the shorter pair ca. 1.5 cm long, the slender filaments villous, arching up under the upper throat, the anthers ellipsoidal, dorsifixed, ca. 4 mm long, externally villous-hirsute, each locule bearing proximally a sharp narrow horn ca. 1 mm long; ovary superior, bicarpellate, ellipsoidal, smooth, the numerous ovules with axile placentation, the slender style arching up under the upper (dorsal) side of the corolla and terminating in an erect pair of short-linear, laminar stigmas presented slightly beyond the level of the longer stamens.

Fruit: Capsule ovoid, 5-6 mm long, smooth; seeds curvate-angulate, to 2.5 mm long, brown, reticulate.

Distribution and Flowering Season:

Calcareous river and creek bluffs and cliffs, middle Kentucky southward into middle Tennessee and northwestern Georgia; flowering from August to frost.

Special Identifying Features:

This False-foxglove is in subgenus Aureolaria (Euaureolaria Pennell), distinguishable from subgenus Panctenis by having at least narrowly winged seed, an e-glandular capsule, an externally smooth corolla and a perennial habit. It is distinguished from the seven other species of subgenus Aureolaria by a combination of puberulent stem and pedicels, puberulent, entire calyx lobes. This combination would place it nearest A. dispersa, a Coastal Plain species, from which A. patula is distinguished by its longer (15-25 mm versus 8-10 mm) pedicels, its longer, narrower calyx lobes, its smaller (35-45 mm long versus 40-50 mm long) corollas. The flowering branches are usually strongly spreading (erect on prostrate stems), slender but stiffish, the numerous nodes with spreading, subequal lanceolate bract pairs, at anthesis sometimes quite showy with double rows of fine yellow blooms.

Habitat and Management Implications:

A. patula appears to be genuinely narrow in range and rather rare within that range, with certain and recent sightings being made from along the bluffs of the Tennessee and Clinch Rivers and tributaries in the Valley and Ridge Province of eastern Tennessee and along the Coosa River in northwestern Georgia near Rome (the type locality). Dr. Leo Collins has recently located several small populations in the area of Kingston, Tennessee, along river bluffs, and may be the only living botanist to have seen much of the species. My own experience with it is from but two areas, one near Kingston, the other from bluffs of the Coosa River near Rome.

This species appears to be a calciphile, is reportedly root-parasitic on oaks. It is generally found on steep limestone bluffs, in the shade of rather open stands of mixed hardwoods and occasional Juniperus. The soil is heavy, often shallow. Commonest overstory trees are Quercus muhlenbergii, Q. alba, Q. shumardii, Acer saccharum, Fraxinus quadrangulata, F. americana, Ulmus americana, U. rubra, Carya carolinae-septentrionalis, C. ovalis, with an abundance of Cercis, Rhamnus, Forestiera ligustrina, Viburnum rufidulum, Philadelphus, Rhus spp. in the understory. Common herbaceous associates are Chasmanthium latifolium, Melica, Bromus purgans, Elymus, various calciphilic carices, Anemone virginica, Aquilegia, Galium circaezans, Spigelia marilandica, Asclepias quadrifolia, Saxifraga, Heuchera villosa, Penstemon, Solidago sphacelata, S. ulmifolia, Aster shortii, etc.

The steepness of the terrain frequented by this species precludes heavy logging. The timber is not easily accessible and any heavy removal of it would have an adverse effect in terms of erosion of the soil mantle. Recent observations of the plants appear to have it in light to fairly heavy shade thus it is likely that

removal of overstory would, in addition to exposing this herb to too much light and drying, invite invasion of undesirable woody and herbaceous weeds such as Smilax, Lonicera, Pueraria, Rubus.

References:

Chapman, A.W. 1878. Dasystoma patula in Bot. Gaz. 3: 10.

Pennell, F.W. 1928. Aureolaria patula in Proc. Acad. Nat. Sci. Phila. 80: 409-410.

_____ 1935. Aureolaria in Scrophulariaceae of eastern temperate North America. Acad. Nat. Sci. Phila. Monogr. 1: 397.

Small, J.K. 1933. Manual of the southeastern flora, pp. 1213-1216.

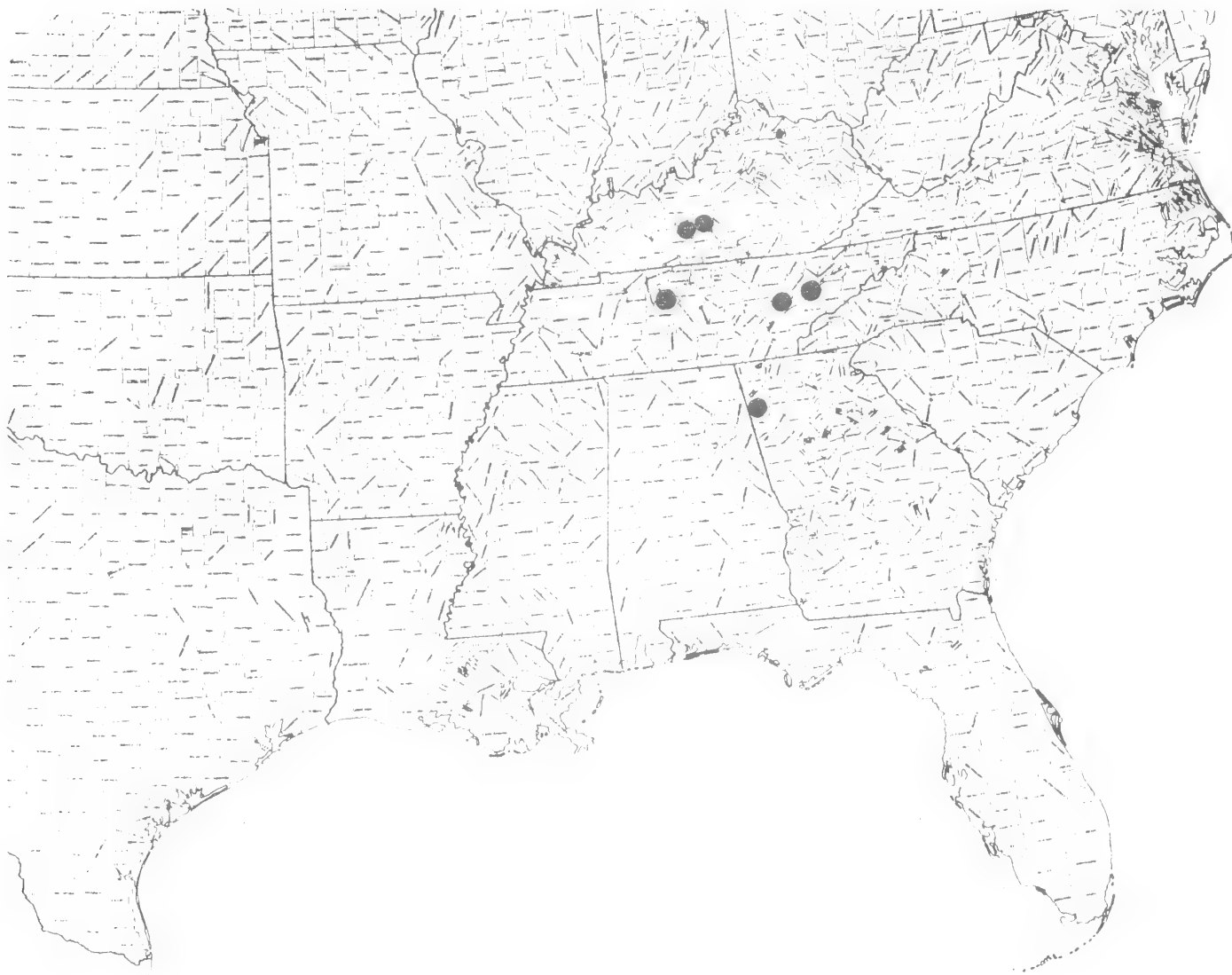
SPECIES: Aureolaria patula (Chapm.) Pennell

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy	NA	NA	NA	NA		x	NA	
Damage					x			
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Aureolaria patula (Chapm.) Pennell



SCROPHULARIACEAE

Schwalbea americana L.

S. australis Pennell

Status: Endangered

Technical Description:

Perennial, caulescent, root-parasitic herb.

Stems: erect, simple or branched only at base, rarely taller than 6 dm, the nodes numerous, the internodes terete, villous proximally, puberulent distally, yellow-green tinged with red or purple distally.

Leaves: alternate, estipulate, sessile, the larger sometimes spreading, but mostly all ascending or erect, overlapping in a tight spiral, the smallest scale-like at stem base, the largest in the lower 1/3 of the stem, elliptic, lanceolate, rarely oblanceolate, mostly 2-4 cm long, rather fleshy, acute, entire, slightly revolute, the base cuneate, the surface yellow-green or deep dull green with red undertones, both sides pale-villous-puberulent, the venation sparsely pinnate, impressed above, only the midvein much raised beneath, or triplennerved; foliage leaves grading gradually smaller and narrower upward into bracteal leaves.

Inflorescence: Flowers ascending, short-pedicellate from axils of leaflike bracts, in a tight, usually many-flowered, spikelike raceme, the pedicels ca. 2.0-2.5 mm long, villosulous, apically bibracteolate, the bracteoles linear, shorter than the calyx.

Flowers: bisexual, strongly zygomorphic; calyx 1.5-2.0 cm long, the lobes 5, unequal, triangular, 1-nerved, shorter than the narrowly campanulate tube and projecting forward, the upper lip shallowly 2-lobed distally, the lower 3-lobed and longest, the tube strongly 10-nerved; corolla strongly bilabiate, narrow, ca. 3 cm long, proximally yellow, distally purplish or reddish, the lips about as long as the tube and projecting forward, the upper a galea, longer, shallowly 2-lobed distally the lower 3-lobed and with a hairy palate inside; stamens 4, epipetalous, included in the upper lip, didynamous (1 pair shorter), the filaments slender, smooth, longer than the oblong, dorsifixed yellow anthers; ovary superior, erect, bicarpellate, the slender style curved up and arching within the upper corolla lip in line with the filaments, its narrow stigma protruding slightly beyond.

Fruit: Capsule mostly contained in the persistent calyx, oblong-cylindrical, ca. 1 cm long, septicidal, its narrowed apex developing an annulus around the persistent style base; seeds numerous, pale greenish-brown, linear-fusiform, somewhat compressed and bordered, ca. 2.5-3.0 mm long, very minutely cancellate.

Distribution and Flowering Season:

Moist pine flatwoods, savannas, bog borders, open oak woods, Coastal Plain with extensions inland in New York and in Massachusetts and the southern Appalachians, southward to northern Florida and westward into Louisiana. Rare and extremely local. Flowering in the south mostly from April into June.

Special Identifying Features:

Chaffseed is monotypic and is, in habit and general appearance of bloom as well as in its alternate leaves, most similar to other root parasites such as Castilleja, Orthocarpus, but, unlike any of the other seven genera in the Tribe Euphrasieae that occur in eastern North America, its pedicels bear two bracteoles. Its slender seeds, as in Castilleja, Orthocarpus, have a loose and reticulate seed coat. It is the only genus in the complex that has septicidal capsule dehiscence. These plants darken in drying, as do most others of the complex.

Habitat and Management Implication:

My field observations of this rare plant are confined to but two populations in the Gulf Coastal Plain; however they appear to agree with label notes on specimens from other areas in the South. The Schwalbea plants are in grass-sedge systems, in moist acidic sandy loams or sandy peat loams. The tree-dotted landscape is best described as savanna, with higher elevations dominated by Longleaf Pine and deciduous scrub oak, the lower elevations boggy, sometimes Titi-Magnolia virginiana bays, sometimes Pond Pine-Pond Cypress-Nyssa biflora. Schwalbea is intermingled with a large variety of grasses in Andropogon, Panicum, Aristida, Paspalum and sedges in Rhynchospora, Scleria, Dichromena, Carex, Fimbristylis. Lachnocaulon, Eriocaulon (E. decangulare), Xyris, Aletris, Calopogon, various Juncus and a variety of colorful savanna dicots such as Eryngium, Polygala, Asclepias, Phlox, Psoralea, Erigeron, Helenium, Heterotheca (H. oligantha) are common associates. The grass-sedge complexes are interrupted by stands of shrubs in Myrica, Ilex (I. glabra, I. coriacea), Cliftonia, Vaccinium, Gaylussacia, Lyonia, Leucothoe. The savanna is fire maintained.

Such sites are well suited to plantation of Slash Pine and also are of high potential for crop agriculture. In either case they are drained and the grass-sedge system destroyed.

References:

- Pennell, F.W. 1935. Scrophulariaceae of eastern temperate North America. Acad. Nat. Sci. Phil. Monogr. 1, pp. 482-487.
- Radford, A.E., H.E. Ahles & C. Ritchie Bell. 1968. Manual of the vascular flora of the Carolinas, p. 261.
- Small, J.K. 1933. Manual of the southeastern flora, p. 1223.

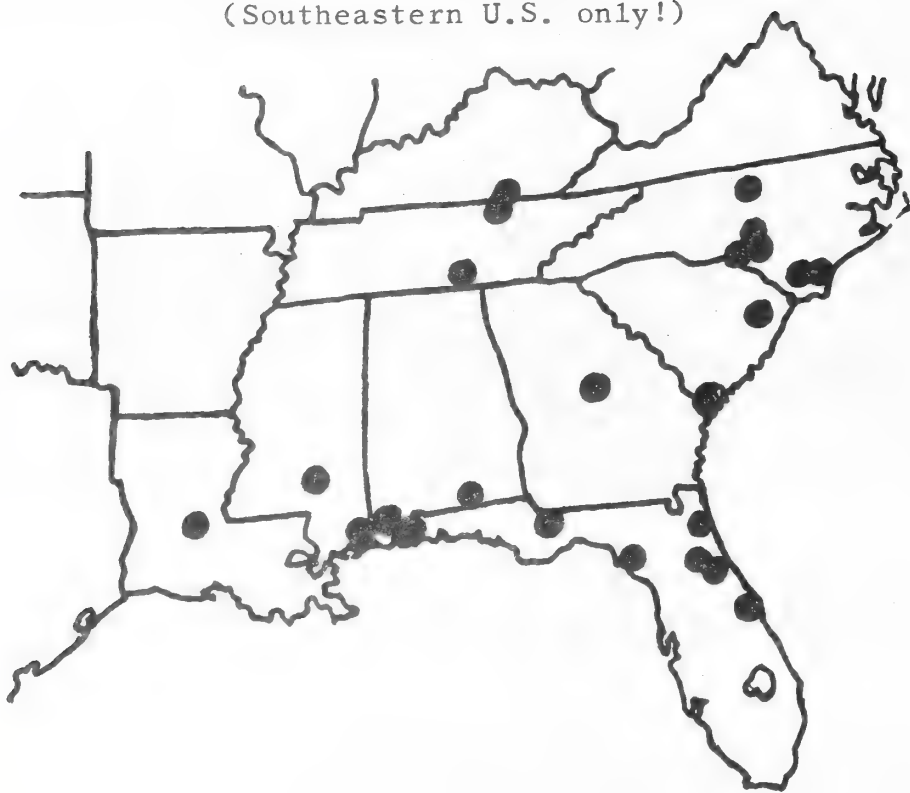
SPECIES: Schwalbea americana L.

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X		X			X	
Damage No Lasting Effect			X					X
Beneficial if Done Properly	X				X	X		

Other Comments: Do not drain!

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Distribution of :
Schwalbea americana L.
(Southeastern U.S. only!)



VERBENACEAE

Verbena maritima Small

Glandularia maritima Small

Status: Threatened

Technical Description:

Perennial from a tap-and-diffuse root system.

Stems: rarely erect, usually several from a short crown, quadrangular, sprawling, leaning, procumbent or repent, rooting from nodes of creeping stems, often to 1 meter long, the internodes many, the branches few to several, strigose and strigillose, with whitish, antrorse hairs, purplish or green, the nodes bristly hairy.

Leaves: opposite, and usually erect from the sprawling or prostrate stems (secund), petiolate, the blades narrowly ovate, cuneate, spathulate, or oblanceolate, mostly 2-5 cm long, the apices broadly rounded to obtuseangled, the margins above mid-blade coarsely serrate, incised-lobed or lacerate, entire and attenuated below to near base of petiole, both surfaces yellow-green, the upper sparsely strigose, the lower smoothish or sparsely hairy along the raised veins.

Inflorescence: A densely floriferous to slightly interrupted, cylindrical spike mostly 2-5 cm long, fully 5 cm broad across the flowers, 1.5-2.0 cm wide across the fruiting calyces, terminal, raised, somewhat above the upper stem leaves of main axis and branches on erect or ascending, stiffish peduncles, the individual flowers each in the axil of an ascending or erect, green, narrowly triangular-subulate, strigose bract ca. 5 mm long.

Flowers: slightly irregular, bisexual; calyx strongly ascending or nearly erect, ca. 1 cm long, the 5 sepals fused into a 5-ribbed narrow tube this green or tinged with purple, strigillose and long-stipitate-glandular, its oblique orifice with 5 somewhat upswept bristly teeth, the lower ones subulate-linear, to ca. 1 mm long, the upper 2 shorter, more broadly triangular-based; corolla gamopetalous, salverform, the slender tube and narrowly campanulate, short throat pilose-tomentose, ca. 2.0 cm long, the spreading limb 1.5-2.0 cm wide, of 5 strong but unequal lobes, the upper 2 broadly cuneate-oblong, the laterals slightly longer, oblong-emarginate, the lowest lobe largest, narrowly obovate, apically very retuse, the limb surface a lively lavender with an orangish-red "eye" above, paler beneath, the tube and throat paler lavender; corolla surface internally scattered pilose in the tube, densely hirsute in the throat, the tips of some of the stiffish hairs exserted; stamens 4, didynamous, 1 pair (fertile) with filaments arising at level slightly above that of the other, these with anthers sessile or nearly so; anthers short-oblong or ellipsoidal, yellow, ca. 1 mm long, the filaments flattish, no longer than the anthers; ovary superior, oblong, the style terminal, narrowly linear, slightly dilated toward apex, the stigma subcapitate, bilobed, 1 lobe triangular, somewhat flattened, the other roundish, glandular.

Fruit: Fruiting calyx tightish around nutlets, the intervals between the 5 ribs thinnish; nutlets 4, ca. 4 mm long, cylindrical, pale brown, all but a narrow ventral groove strongly ridged-reticulate, the areoles more elongated-rectangular toward fruit base.

Distribution and Flowering Time:

Sandy clearings, particularly duneswales, in coastal sandscrub and open Live Oak-Cabbage Palm woods along the coast, peninsular Florida; flowering mostly in early spring, but intermittently all year.

Special Identifying Features:

V. maritima overlaps in range and habitat only with one other "Glandularia" (V. tampensis, which see!) but that species, which tends to be more abundant on the Gulf coast of Florida, has somewhat larger leaves tending to be more ovate, more regularly toothed, the stems less procumbent or repent, the calyx lobes with longer bristle tips (the longer ones mostly over 1.5 mm long).

Habitat and Management Implications:

V. maritima is well named in that it is most abundant in and around open sandy areas close to the present coast of peninsular Florida or along sandy ridges paralleling inlets. Some common herbaceous associates are Uniola paniculata, Panicum amarum, P. amarulum, Eragrostis oxylepis, Cenchrus, Cyperus ligularis, C. retrorsus, Crotalaria pumila, Lupinus, Phaseolus, Tribulus, Ipomoea, Ipomopsis, Monarda punctata, Physalis viscosa, shrubby Solanum, Gaillardia pulchella, Heterotheca subaxillaris. Yucca and Opuntia are common. The dunescrub surrounding the sandy clearings is heavy in Saw Palmetto, but has abundant representation of Myrica, Persea, Ardisia, Rapanea, Eugenia, Ilex, Smilax, evergreen scrub oaks, this often interspersed with hammocks largely of Cabbage Palm and Live Oak, or stands of Sand Pine mixed with Slash Pine. The sandy clearings in the past were probably maintained through a combination of natural fire and wind, which continues to move shifting sands inward from the beaches.

Much of the original habitat of this species has been lost in the last few decades not so much through the removal of merchantable timber such as Slash Pine as through commercial development, urban expansion, beachfront exploitation. Some areas cleared for these purposes may be colonized by the Verbena along with other sand dune pioneers, but this is a temporary respite. Problems are also arising for such herbs in beach areas of southern Florida because of the unwelcome increase of the introduced and pernicious Australian Pine (Casuarina equisetoides) whose takeover of some sites approaches 100%, and swamping also by the equally bad grass Rhyncheletrum roseum.

References:

Perry, Lily M. 1933. A revision of the north American species of Verbena. Ann. Mo. Bot. Gard. 20 (2): 239-363.

Small, J.K. 1933. Manual of the southeastern flora, pp. 1138-1139.

SPECIES: Verbena maritima Small

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy							X	
Damage								
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Site preparation methods not observed in this area, probably because the land is such expensive real estate.

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Verbena maritima Small



XYRIDACEAE

Xyris tennesseensis Kral

Status: Endangered

Technical Description:

Perennial, smooth, Yellow-eyed-grass, the plant base soft, somewhat fleshy, often bulbous, usually encased in dark, scale-like outer leaves, the roots slender, shallow, fibrous.

Leaves: all basal, the outermost scale-like, the larger ones linear, 14-45 cm long, the blades linear-gladiate (narrowed at base and apex), 0.5-1.0 cm broad, flat or slightly twisted, bright green, the apex incurved, bluntly acute, somewhat thickened, the margins slightly thickened, entire; equitant base $1/3$ - $1/8$ the length of the blade, pink, red or purple, the margin pale, broad, scarious (very thin), the surfaces smooth or finely papillate.

Scapes: sheaths of scape shorter than the foliage leaves, reddish or brownish proximally and with short blades; scapes linear, straight, 30-70 cm long, usually flattened and 2-5-ribbed distally and with at least 2 ridges quite wide and tuberculate-scabrid, subterete and 2-several ribbed proximally.

Inflorescence: spikes solitary and terminal on scapes, broadly ovoid, 1.0-1.5 cm long, blunt, of several tightly and spirally imbricated bracts, all except the lowermost and uppermost producing a single flower in the axil; fertile bracts suborbicular, rounded, entire or slightly erose, tan save for greenish, ovate-triangular dorsal areas.

Flowers: slightly zygomorphic (calyx), bisexual; calyx 3-parted, the outer sepal membranous and enfolding the flower in bud, the inner 2 subequal, opposite, boat-shaped, included, curvate, the keels thin, narrow, the distal half lacerate, broader, reddish-brown; petals 3, distinct, long-clawed, the blades obovate, ca. 4.5 mm long, 3.0 mm broad, yellow, apically rounded, lacerate, unfolding in morning; staminodes bi-brachiate, distinct, 3, the long hairs beaded; fertile anthers 3, arising just above the petal claw and erect, the anthers ca. 2 mm long, lance-linear, the sacs near parallel, their tips projecting apically 0.4 mm beyond the flat connective apex; ovary superior, 3-carpellate, compressed-ovoid, the many ovules marginal in the single locule, the style elongate-linear, tubular, branching at level of the anthers into 3, linear, spreading, tubular branches, the stigmatic tips horseshoe-shaped, minutely hairy.

Fruit: A thin walled capsule splitting open by 3 valves; seeds ellipsoidal, ca. 0.5-0.6 mm long, slightly to very farinose (mealy surfaced), with 18-20 fine, longitudinal lines, these sometimes irregular or joining, also interconnected by finer cross-lines.

Distribution and Flowering Season:

Wet peaty seep slopes or shallow peaty swales, streambanks, Highland Rim of Middle Tennessee (Lewis County) and Valley and Ridge of northwestern Georgia; flowering from August through September.

Special Identifying Features:

This narrow endemic is distinguished from most other North American species by a combination of bulbous, colored bases, tuberculate-scabrid scape ridges, lacerate lateral sepal keels, and dark, farinose coated seeds. This essentially tropical and subtropical genus has but few representatives in Tennessee and northern Georgia and only one of these, namely X. torta, superficially resembles it. However, X. torta, which is strongly bulbous - based and has very twisted, strongly ribbed leaves, has fertile bracts tipped by crisped reddish hairs (lacking in X. tennesseensis), ciliate lateral sepal keels (those of X. tennesseensis are lacerate), and clear, rather than farinose seeds. Of all southeastern Xyris, the var. floridana of X. difformis most resembles X. tennesseensis but this variety has foliage generally scabrid overall, its spikes are more acute, its fertile scales are darker colored, its leaves tend to be flatter and to spread fanlike.

Habitat and Management Implication:

So far as is now known this Xyris is a genuinely rare and definitely endangered species. In middle Tennessee it is found only in Lewis County, in the Swan Creek watershed, either in open very local bog slopes where water seeps over and out of an upper Paleozoic calcareous sand, or in small openings along shale - bedded streams. The dominant vegetation of the Tennessee seep areas is grass-sedge, with the sedges in late season being mostly Rhynchospora capitellata, Scirpus, Eleocharis, the grasses being Leersia, Panicum, Agrostis, Cinna, Andropogon. Juncus is common, with a constant associate species being J. brachycephalus (Engelm.) Buch., an essentially northern plant. Dominant late season dicots are Parnassia grandiflora (in Tennessee), Phlox glaberrima, Lysimachia, Rudbeckia fulgida umbrosa, Solidago patula, and various wetland Aster. The Georgia site I have visited is similar, but is a swale rather than a seep-slope, and lacks the Parnassia. The substrate is usually shallow, but is continuously saturated and highly peaty. Surrounding woody vegetation is, in Tennessee, upland hardwoods, mostly Oak, Hickory, White Ash, Elm, Hackberry, Maple (both Sugar and Red), with a scattering of Juniper, with an understory mostly of Dogwood, Viburnum, Redbud, Sourwood, Ostrya, Carpinus, Vaccinium arboreum, Rhamnus; Alnus serrulata, Salix nigra and S. caroliniana, Sambucus and Cephalanthus abound along the streambanks and lower seep slopes.

Contiguous upland and ravine slope hardwoods in Lewis county have sustained much logging and are undergoing intensive logging today. Damage to the Xyris may be sustained through the disturbance of the seep areas by heavy equipment used in the logging operation. If care were taken not to do this, the Xyris might be favored to increase into areas previously too shady for it. However, the small openings it now occupies give every impression of having been there for a long time, and were probably maintained largely because of the wetness and shallowness of the substrate which would make it unsuitable for growth or colonization by most arborescent species, as well as by occasional natural woods fires.

The known Georgia populations of X. tennesseensis are now destroyed. The Bartow County site, a seep slope, was demolished through construction of a portion of Interstate Highway 75; the Gordon County locality which was along a railroad right of way beside U.S. Highway 411, has been drained out of existence.

References:

Kral, R. 1966. Xyris (Xyridaceae) of the continental United States and Canada. Sida 2 (3): 177-260.

_____. 1978. A new species of Xyris (sect. Xyris) from Tennessee and northwestern Georgia. Rhodora 80 (823): 444-447.

SPECIES: Xyris tennesseensis Kral

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		NA	NA	NA			NA	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Upslope clear-cutting or site preparation may result in excessive erosion, this choking out vegetation in ravine bases.

*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Range of:
Xyris tennesseensis Kral



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CARYOPHYLLACEAE

Arenaria godfreyi Shinn. Godfrey's sandwort

Stellaria paludicola Fern. & Schub.

Technical Description

Short lived perennial or winter annual from a shallow, flimsy, diffuse-fibrous root, producing mats of slender, prostrate, creeping or ascending wintering stems that root at lower nodes.

Stems.--Primary stems erect or ascending, decumbent-based, softish, 1-3 dm high, arising from axils of wintering stems, simple or sparingly branched toward base, ca. 1 mm thick, sharply longitudinally ribbed, also grooved, pale green, smooth save at the thickened nodes where sparsely puberulent with capitate pale hairs.

Leaves.--Opposite, estipulate, those of winter shoots glabrous, mostly 1.5 cm long or less, distinctly petiolate, the petioles troughed above, clasping based, with blades spathulate, oblanceolate or elliptic, acute, entire, yellowing as floriferous shoots flower; leaves of main stems spreading to erect, at mid-stem and above rather distant and progressively more sessile, linear-oblanceolate, linear or linear-spathulate, 1.5-3.0 cm long, acute with tips somewhat callused, margins entire, surfaces pale green, smooth save toward clasping bases and along the single evident vein beneath, there with pale, weak capitate hairs; upper leaves subtending lower inflorescence branches somewhat reduced, grading abruptly or gradually into short, oblong-linear bracteal leaves.

Inflorescence.--A terminal, compound, open diffuse cyme, the pedicels slender, glandular pilosulous at least basally and apically, the central or lower ones longest, 1-4 cm long, exceeded only by main or lateral branches.

Flowers.--Regular, perfect; sepals 5, distinct, erect, lance-oblong, ca. 4 mm long, pale green, apically rounded-apiculate, the apiculus purplish, marginally entire, pale-scarious, the bases bowed outward, glandular-puberulent externally, the outer surfaces distinctly triple-nerved, the ribs puberulent proximally; petals 5, distinct, spreading toward apex, oblong-spatulate, 10-12 mm long, white, the broadly rounded tips shallowly notched; stamens 8-10, ascending, the filaments slender, white, flattened and dilating proximally, 5-8 mm long, the anthers basifixed, bilocular, broad-oblong, ca. 0.7-1.0 mm long, yellow-green or pinkish; ovary smooth, ovoid or ellipsoidal, ca. 3.5 mm long, thin walled with a thicker concave (umbilicate) apex, the styles 3, distinct, linear, ca. 2.5 mm long, papillose-stigmatic from middle to slightly dilated tip; placentation free-central.

Fruit.--Ovoid, ca. 4 mm long, lustrous, green, later pale brown, umbilicate, the 3 valve tips hard-margined, truncate; seeds nearly round, ca. 0.8 mm wide but laterally slightly flattened, dark red-brown, the surfaces muriculate, with tubercle tips round-dilated and minutely papillate.

Distribution and Flowering Season

Full sun or light shade of springy creekbanks, seeps, meadows, and shores, usually over calcareous rock, Valley and Ridge of Virginia and Tennessee, Coastal Plain of the Carolinas, northern peninsular Florida, Alabama, Arkansas (Louisiana?); flowering from March into May.

Special Identifying Features

This taxon, once described as a Stellaria by Fernald and Schubert, with its lineal leaves, ribbed sepals, and conspicuous, white, apically shallowly notched petals, is superficially nearest to the calciphilic A. patula Michx. of limestone barrens of the inner Coastal Plain, Interior Low Plateau and various other central physiographic provinces in the east or mid-west, or to A. muriculata Maguire of seeps and wet meadows west of the Mississippi in Missouri, Arkansas, Oklahoma, Louisiana. A. godfreyi is particularly to be distinguished by the stipitate-glandular pubescence of its nodes, leaf bases, pedicels and sepals, together with the unique character of its seed papillae, these being rounded-dilated apically and there minutely granular-papillose (unlike those of A. muriculata, which are simply tubercle-like and not dilated-papillose apically).

Habitat and Management Implications

A. godfreyi frequents permanently moist to wet, springy banks of springs and streams, seep slopes or wet grassy swales, usually in full sun, sometimes in light shade. It has a wide, scattered distribution, thus is found in a variety of forest systems. In the type locality area it is usually along small streams that course through slash pine-saw palmetto, through titi, or through low hammock composed of mixed hardwoods, slash and loblolly pine, and cabbage palmetto. The underlying rock is limestone. In the Valley and Ridge Virginia locality it is in seeps over calcareous shale, the surrounding forest being a mixture of upland yellow pines, with various upland hardwoods along and around the seeps. In the Coastal Plain of the Carolinas it is found on seeps over marl in lowland hardwood-pine complexes. In southern Arkansas it is on moist tuffaceous sand in old shallow lake bed, situated in swamp hardwood-loblolly pine-palmetto, and is largely fire-maintained. In Alabama it is known thus far only from a limited area of wet grassy meadow that was cleared from swamp hardwoods, and has marl underlying.

Requirements of the species appear uniformly to be a substratum that is kept permanently moist, but not inundated for long, full sunlight or at most light shade, and a substratum that is fertile, usually basic. In Taylor County Florida, where plants appear to be most abundant, much of the low land has been cleared of hardwoods and residual lowland pine and has then been planted to slash pine. This has had to produce a negative effect on the Arenaria in that soil disturbance along the shallow streams is often extreme, much altering the drainage pattern. Also a more uniform overstory and a heavier shade is created, which has eliminated fine habitat for this plant of sun. The best patches of it now appear in ditches along main and access roads, usually in the vicinity of culverts through which the small streams flow. It would probably be best for this species were forest managed without artificial drainage or any mechanical manipulation of the seep soils. Windthrow of overstory species, fires during drier cycles, were doubtless historical factors in providing suitable habitat.

References

- Fernald, M.L. & B. Schubert, 1948. Studies in the British herbaria. *Rhodora* 50: 197.

Maguire, B. 1951. Studies in the Caryophyllaceae--V. Arenaria in America north of Mexico, Amer. Midl. Naturalist 46: 493-511.

Shinners, L. H. 1962. New names in Arenaria (Caryophyllaceae). Sida I: 49-52.

Wofford, B. E. 1981. External seed morphology of Arenaria (Caryophyllaceae) of the southeastern United States. Systematic Botany 6 (2): 126-135.

SPECIES Arenaria godfreyi Shinnery. Godfrey's sandwort

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	X
Damage								
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Arenaria godfreyi Shinnars



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GLOSSARY

- Abaxial.--On the side of the appendage away from stem or axis.
- Acaulescent.--Lacking a stem (plants with peduncles arising from rosettes often appear to have stems, but are acaulescent).
- Actinomorphic.--Radially symmetrical, as in the graphic "star", starfish, snowflake, tube or cylinder; any longitudinal plane through the central axis produces similar halves.
- Acuminate.--Apex tapering concavely to a sharp point.
- Acute.--Apex with sides straight, forming an angle of 90° or less.
- Adaxial.--On the side of the appendage toward stem or axis.
- Adnate.--Part or parts of one cycle of a flower variously united to a part or parts of another cycle.
- Adventitious.--Growth of one organ from another in some other way than customary (i.e. new shoots directly from fire-scarred trunk of pond pine or pitch pine; 'prop' roots of mangrove, corn).
- Akene.--A single-seeded, dry, indehiscent fruit with pericarp usually thin, attached to seed at but one point but superficially appearing tight.
- Allopatric.--Species or subdivisions of species in a genus are allopatric if their geographic ranges do not overlap.
- Alternate.--Arrangement of parts on a common axis one per node.
- Amplexicaul.--Strongly clasping the axis.
- Anastomosing.--Veins, nerves or chains of cells converging or cross-joining to form a closed network.
- Androgynophore.--A common stalk supporting both male and female floral parts above the level of departure of perianth.
- Androphore.--Stalk as in above producing only stamens.
- Angiosperm.--Class of vascular plants in which ovules are borne within ovary wall; flowering plant.
- Annual.--A plant going from seed to seed in a single growing season, dying at the end.
- Anther.--Pollen-producing part of the stamen.
- Anther sac.--Pollen chamber.
- Anthesis.--The time of receiving and/or sending pollen.
- Antrorse.--Directed forward or upward on a surface.
- Apex.--Tip.
- Apical.--Referring to apex.
- Apiculate.--Apex ending abruptly in a short-pointed tip.
- Apomixis.--Mode of reproduction bypassing gametic fusion.
- Appressed.--Flattened against.
- Aquatic.--Living in water.
- Arachnoid.--A cobwebby pubescence is arachnoid.
- Aril.--An outgrowth of the hilum or the funiculus of a seed, or a fleshy, modified appendage of the sporophyll.
- Aristate.--Bristle-awned.
- Ascending.--Curved upward from the base.
- Attenuate.--Gradually and finely tapering (usually referring to plane base).

Auricle.--Ear-lobed-like, usually paired, appendages at base of a blade or bract, or at leaf sheath apex.

Awl-shaped.--Rigid, narrowly-triangular, tapering to a sharp point, as in leaves of many Juniperus.

Awn.--A rigid, bristle-like appendage (as in wheat, barley, etc.)

Axil.--The internal angle formed at junction of appendage and axis.

Axile.--At the axis, as in axile placentation.

Banner.--The upper petal of many leguminous plants.

Barbellate.--Finely barbed, as in the pappus of many composites.

Basal.--Position of appendages on an axis (i.e. basal rosette), or a placentation type in which one or more ovules are at the locule base.

Basifixed.--A basal attachment of an organ or organ part.

Bearded.--Bearing a tuft or beard of longish trichomes.

Berry.--A fleshy, indehiscent, two or more-seeded fruit.

Biennial.--A plant that completes its life cycle in two years, usually producing a rosette the first season, bolting from it the next.

Bifid.--Forking at apex.

Bilabiate.--Two-lipped, as in the corolla of many mints, snapdragons.

Bipinnate.--An arrangement in compound leaves where the main rachis has rachises pinnately arranged along it.

Bisexual.--Producing both sexes in one flower.

Blade.--The flattened "laminar" part of an appendage such as leaf, sepal, bract, petal, etc.

Bract.--A leaflike appendage within an inflorescence, subtending an inflorescence, or along a pedicel below the receptacle; usually smaller than the foliage leaf, sometimes modified to resemble perianth (as in Nyctaginaceae, Cornaceae, etc.)

Bracteole.--Diminutive of bract.

Bud.--An unexpanded shoot or flower.

Bulb.--An underground storage organ primarily made up of imbricate fleshy leaves (i.e. onion, tulip).

Bulblet.--Diminutive of bulb, often aerially formed (as in axils of lily leaves, onion inflorescences); bulbil.

Caducous.--Falling off early, as in sepals of bloodroot.

Caespitose.--Tufted.

Calciphilic.--Requiring calcareous substrate.

Callus.--A hard, local thickening; in grasses the hard, often hairy or pointed base of the floret.

Calyculus.--A cup formed by connation of one or more series of bracts or bractlets.

Calyx.--Outermost cycle or cycles of perianth, often the only perianth in many specialized flowers; a collective term for all sepals.

Cambium.--The lateral meristem in vascular plants.

Campanulate.--bell-shaped.

Cancellate.--A finely latticed surface.

Canescent.--A grayish, short pubescence.
 Capitate.--Head-like.
 Capsule.--A dry, several to many-seeded fruit, usually the product of a compound of two or more carpels.
 Carpel.--A seed producing specialized leaf; a megasporophyll; one or more make up the female part of the flower.
 Caruncle.--An outgrowth from or around the hilum of a seed (i.e. outgrowth in castor bean).
 Caryopsis.--A dry, single-seeded, indehiscent fruit with a tight pericarp; the fruit of most grasses.
 Castaneous.--Chestnut brown.
 Catkin.--A lax, often elongate, many-flowered unisexual inflorescence of small, bracteate but otherwise naked flowers.
 Caudate.--Producing a tail-like appendage.
 Caudex.--A short vertical axis involving either rhizome apex or stem base.
 Caulescent.--Producing an above-ground stem.
 Cauline.--Pertaining to stem.
 Chaff.--Collective for thin, papery bracts, as in the heads of many sunflowers.
 Channeled.--Longitudinally grooved.
 Chasmogamous.--Flowers open, usually showy, mostly outcrossing.
 Ciliate.--Bearing a fringe of hairs marginally.
 Ciliolate.--Diminutive of ciliate.
 Circumscissile.--Dehiscence around the equator of fruit or anther.
 Clavate.--Club-shaped.
 Claw.--A petiole-like narrowing at base of sepal or petal blade.
 Cleistogamous.--Flowers remaining closed, usually selfing.
 Clone.--Vegetative replicates of a biotype.
 Collar.--Zone opposite the ligular zone in the leaf of grass-like plants.
 Column.--A welding of sterile portions of male flowers (Hibiscus) or of male and female parts of a flower (Orchidaceae).
 Compound.--A grouping of leaflets (compound leaf), carpels (compound ovary), or inflorescences (compound cyme, umbel, etc.)
 Connate.--Fusion of like parts in a floral cycle.
 Connective.--Sterile tissue connecting fertile parts of anther.
 Contorted.--A flat spiral clockwise or counterclockwise overlapping of parts of a floral cycle (usually petals) in the bud, as in Phlox.
 Convolute.--Synonym of above.
 Cordate.--In the shape of the Valentine "heart"; cordiform.
 Coriaceous.--Leathery in texture.
 Corm.--Underground storage organ, typically roundish or oblate, anatomically a compacted stem invested by thin scale leaves and producing daughter corms (cormels) apically (Gladiolus, many orchids, etc.)
 Cormophyte.--Ecological term for an herb with strong underground storage organs, such as would be common in droughty or savanna soils.
 Corolla.--Collective term for petals.

Corona.--Tissue formed in development of petals and stamens in a floral tube to produce "webbing" between filaments; may be staminal solely (Hymenocallis) or staminal and corollal (Narcissus).
 Corymb.--A specialized raceme, determinate and convex, in which the symmetry is as wide as long or wider, the lowest flowers with the longest stalks.
 Costa.--A strong rib or midrib.
 Costate.--Strongly longitudinally ribbed.
 Cotyledon.--The first leaf (Monocotyledons) or leaves (Dicotyledons) to develop from the embryo.
 Crenate.--A scalloped leaf margin; diminutive is crenulate.
 Crown.--Inner, often coronal or corona-like outgrowth from perianth base or corolla throat.
 Culm.--The stem in grasses or grass-like plants.
 Cuneate.--An acute base.
 Cuspidate.--Apex tipped with a narrow, firm, sharp point.
 Cyme.--A broad, flat-topped or somewhat concave inflorescence with the central flower or flowers opening first.
 Cymule.--A cymose unit of a compound cyme.
 Cystolith.--Crystallized calcium deposits in cells, often visible in leaf epidermis as lens-shaped bodies (Acanthaceae, Urticaceae, etc.)
 Deciduous.--Seasonal shedding, usually by abscission, usually in reference to leaves.
 Decumbent.--Base of stem or shoot arching outward and downward, then erect.
 Decurrent.--Base of appendage running evidently downward from its point of attachment on axis.
 Decussate.--Arranged oppositely or whorled on axis so that members of alternate nodes are in vertical alignment (i.e. Juniperus, Cupressus, Rhexia, etc.)
 Dehiscence.--Splitting, as in valves of mature fruits, anthers, etc., usually along a suture.
 Deltoid.--"Delta" shaped.
 Dentate.--Toothing of a blade margin so that the teeth are spreading, roughly equal-sided.
 Denticulate.--Diminutive of dentate.
 Determinate.--With definite number; in inflorescences, a type in which the apical bud is first to open.
 Dichasium.--A basic cymose inflorescence; a simple dichasium is a symmetrical, triflorous, cyme; a compound dichasium is 3-branched, the central branch a pedicel, the laterals developing simple dichasia.
 Dicotyledon.--An angiosperm with two embryonic leaves.
 Didymous.--Two-paired, as in stamens of mints, etc.
 Didynamous.--Several stamens, two equal and shorter than the others.
 Dimorphic.--Two forms of the same part or organ.
 Dioecious.--Species having unisexual individuals.
 Disc.--An outgrowth of tissue from the receptacle around the base of an ovary and often between filament bases.

Distichous.--Arrangement of leaves or parts into a single plane oppositely along a common axis.
 Dorsal.--Backside of an appendage.
 Dorsifixed.--Attachment of stamen filament to back of connective.
 Drupe.--A single-seeded, fleshy, "stone" fruit.
 Echinate.--A spiny, sharply tuberculate, or prickly surface.
 Elliptic.--With the outline an ellipse.
 Ellipsoidal.--A solid with an elliptic outline.
 Emarginate.--Shallowly notched at apex.
 Embryo.--Everything inside a seed except seed coat and endosperm.
 Endemic.--Confined in distribution to but one geographic area.
 Endocarp.--Innermost, often vascularized, sometimes stony, layer of ovary wall.
 Endosperm.--Triploid or polyploid nutritive product of double fertilization in angiosperms.
 Entire.--The untoothed or unappendaged, straight-line edge of a blade.
 Epidermis.--The outer tissue layer of the plant body.
 Epigynous.--Floral parts appearing to arise from ovary apex.
 Epipetalous.--Stamens appearing to arise from petals.
 Epiphyte.--Growing upon another plant.
 Equitant.--Arrangement of a distichous sort, in which each base fits into the base of the leaf or part directly beneath.
 Erect.--Orientation of axis plumb.
 Erode.--A finely irregular edge.
 Exocarp.--Outermost layer of ovary wall.
 Exserted.--Projecting beyond.
 Extrorse.--Anthers opening away from floral axis.
 Falcate.--Scimitar-shaped outline of blade.
 Fascicle.--Numerous parts clustered (needles in pines, stamens in Hypericum).
 Fertilization.--The process of fusion of egg and sperm.
 Filament.--The sterile, usually slender, tissue connecting the anther with the flower.
 Filiform.--Hair-like in slenderness.
 Fimbriate.--Close-set, narrow divisions of a margin, usually a strong fringe or tuft of long hairs.
 Flabellate.--Spreading fan-like.
 Floccose.--A woolly-matted covering.
 Flower.--A short reproductive shoot in angiosperms, with the axis forming a receptacle, with appendages modified from leaves, some reproductive (stamens, carpels), others (perianth) sterile, more leaflike or vestigial or absent.
 Follicle.--A dry dehiscent fruit, product of a single carpel, splitting purselike along one line (i.e. milkweed, dogbane).
 Free-central.--A placentation in which there are no cross-walls in the ovary, the placental zones running along a central axis, the columella, in a unilocular ovary.

Fruit.--A ripened ovary wall and contents, sometimes also ripened receptacle and other floral parts as well.
 Funiculus.--The connector of an ovule, later seed, to the placenta.
 Funnel-form.--Funnel-shaped.
 Fusiform.--Spindle-shaped, a narrow, bi-caudate, ellipsoid.
 Gamopetalous.--Petals variously joined.
 Gamosepalous.--Sepals variously joined.
 Geniculate.--Abruptly bent.
 Glabrous.--Smooth-surfaced.
 Gland.--Any organ or modified cell having a secretory function.
 Glaucous.--With a "bloom", this usually a wax and usually a powdery whitening.
 Globose.--A solid round.
 Glomerule.--A small, tight cluster of flowers.
 Glume.--A chaffy bract as in many grass-like plants.
 Gymnosperm.--A seed-bearing vascular plant with ovules not covered by ovary wall (cycads, pines, etc.)
 Gynobasic.--Term for styles that are continuous through the ovary to the receptacle center in such groups with lobed ovaries as borages, mints.
 Gynoecium.--Collective for all female parts in a flower.
 Gynophore.--A stalk subtending an ovary.
 Habit.--A collective term for mode of perennation, overall form.
 Hastate.--Used for plane outlines with basal lobes prominent, projecting strongly and narrowly at right angles, as in the guard of a sword hilt.
 Haustorium.--In seed plants a specialized, tissue-boring, root produced by parasites (i.e. Cuscuta).
 Head.--An inflorescence in which all flowers are sessile on a common receptacle.
 Helicoid.--Coiled in one plane, as in inflorescences of borages.
 Heliophyte.--An obligate sun plant.
 Herb.--A non-woody plant, one that dies back to the rootstock or totally dies at the end of a season.
 Hilum.--The attachment scar left on the seed with the seed detaches.
 Hirsute.--A coarse, spreading, long pubescence, slightly less stiff than in hispid pubescence.
 Hispid.--A stiffish, long, spreading pubescence of sharp hairs.
 Hispidulous.--Diminutive of hispid, the surface thus scabrid.
 Hydrophyte.--An aquatic plant.
 Hypanthium.--That meld of perianth and receptacle that forms a cup, tube or disc from whose rim come perianth lobes and other floral appendages exclusive of carpels.
 Hypogynous.--Floral parts attached to receptacle below the ovary.
 Imbricate.--Overlapping as in shingles (i.e. bud scales, perianth parts in bud).
 Incised.--Deeply and sharply irregularly cut margins of blades.

Indehiscent.--Compound structure, usually a fruit, that at maturity does not split along sutures.

Indusium.--Outgrowth from leaves of ferns that covers the sori.

Inferior.--Below; term usually denoting a floral type in which free parts depart above the ovary.

Inflorescence.--Any arrangement of flowers on a plant.

Integument.--The outer layer or layers of an ovule, later seed.

Internode.--The area of an axis between two nodes.

Introrse.--With line of dehiscence toward the axis, as in anthers.

Involucel.--A whorl of bractlets.

Involucre.--System of bracts set numerously at base of inflorescence or subdivision of inflorescence.

Involute.--Margin rolled inward.

Irregular.--Denoting a lack of radial symmetry in a flower.

Keel.--A dorsal-longitudinal ridge as in the keel of a boat.

Keel petal.--One of two lower petals in a leguminous flower.

Labellum.--Lip; the lower (or upper) specialized petal in orchids.

Lacerate.--Irregularly jagged margin with divisions and sinuses sharp.

Laciniate.--Margin jagged with consistently narrow lobes.

Lanate.--A pubescence of long, wooly, jointed hairs.

Lanceolate.--The outline of a lance-head.

Lateral.--Arising from the side of an axis or part.

Latex.--A usually white colloid secreted by tubular systems of plant cells called laticifers (i.e. milkweeds, dogbanes).

Leaf.--A nodal outgrowth, usually photosynthetic, usually plane.

Leaflet.--Any leaflike subdivision of a compound leaf.

Legume.--A two-valved, usually dehiscent dry fruit, the product of a single carpel.

Liana.--A vine.

Ligulate.--Developing a ligule, a flat, strap-shaped structure.

Ligule.--A scale-like or fringe-like outgrowth adaxially from the apex of a sheath (as in grass leaves) or at junction of a blade with a claw (as in petals of carnation).

Limb.--The divided or undivided, usually spreading part of a gamosepalous calyx or gamopetalous corolla above the orifice.

Linear.--An elongate narrow outline with width ranging from that of a heavy pencil line to a crayon line; a long narrow parallel-sided outline.

Lip.--One of two major divisions of the limb of a gamosepalous calyx or gamopetalous corolla in bilabiate flowers.

Lobe.--Any rounded-tipped strong division of a margin.

Locule.--A chamber of an ovary, fruit, or anther.

Loculicidal.--A mode of dehiscence where the suture lies over the locule.

Margin.--The border or periphery of a plane appendage.

Marginal placentation.--Placentae on the outer wall of the locule, not intruding.

Membranaceous.--Thin in texture.

Mericarp.--A single and often single-seeded subunit of a dry dehiscent fruit where each subunit is completely separable at maturity.

Mesocarp.--The middle, often vascularized, layer of ovary wall.
 Mesophyte.--A plant of "middle" environment as to moisture requirement.
 Midrib.--The central vein of a leaf, bract, petal, etc.
 Monadelphous.--Filaments joined to form a tube.
 Monocotyledon.--An angiosperm developing but one embryonic leaf.
 Monoecious.--Denoting a condition in a species where both sexes of unisexual flowers are produced on the same plant.
 Monotypic.--Term for family or genus with but one species.
 Mucro.--A short, narrow protuberance at the apex.
 Muricate.--A surface roughened with small, hard, points.
 Nectary.--A gland made up of one or more cells secreting sugary fluid.
 Node.--Zone along an axis at which appendages form.
 Numerous.--Used in reference to floral parts of a large number, at least over 10.
 Nut.--A dry, indehiscent, single-seeded fruit with a bony wall.
 Oblanceolate.--An inverted lanceolate outline.
 Obovate.--An inverted ovate outline.
 Obtuse.--A blunt apex.
 Ocrea.--A sheathing, often tubular, often fringed stipule; the diminutive is "ocreola".
 Opposite.--Paired appendages at node.
 Orbicular.--Round in outline.
 Ovary.--That part of the gynoecium developing and enclosing the ovules.
 Ovate.--Outline as in a hen's egg.
 Ovoid.--Solid with an ovate outline.
 Pale.--The chaffy bract on the receptacular surface of some composites.
 Palmate.--Digital arrangement of lobes of simple leaves or leaflets in compound leaves.
 Pandurate.--Shaped as in the fiddle body.
 Panicle.--A compound inflorescence, longer than broad, made up of fascicles, cymes, racemes, etc. as subunits.
 Papilionaceous.--The butterfly-like corolla of many leguminous plants, made up of a banner petal, two "wing" petals and two keel petals.
 Pappus.--The specialized calyx in composites, this usually persisting atop the maturing fruit and made up of fine to coarse bristles, awns, scales, etc.
 Parasite.--An organism deriving nourishment from another living organism (i.e. Cuscuta).
 Parietal.--Placentation in which the placentae intrude into the locule.
 Pectinate.--A pinnate arrangement of segments in which these are very fine.
 Pedicel.--The stalk of a flower connecting it to the inflorescence.
 Peduncle.--The stalk of an inflorescence or the stalk of a flower if that flower is single on a plant or on a branch.
 Peltate.--A central or subcentral attachment of stalk to blade in leaves or in leaflike structures.

Perennial.--An herbaceous plant that lives for more than two years, dying back to the rootstock at the end of a growing season.
 Perfect flower.--A flower having both sets of sexual parts.
 Perfoliate.--A leaf blade base that completely surrounds the stem.
 Perianth.--Collective term for floral envelope, both sepals and petals.
 Pericarp.--The ovary wall in angiosperms.
 Perigynium.--The modified bract covering the ovary, later fruit, in Carex and Cymophyllus.
 Perigynous.--Parts arising at level around the ovary, usually their fused bases forming part of a disc or hypanthial rim.
 Petal.--The inner, usually brightly colored, cycle or cycles of perianth, usually less vascularized than sepals.
 Petiole.--The stalk of a leaf.
 Petiolule.--The stalk of a leaflet.
 Phyllary.--The involucre bract in composites.
 Phyllode.--A leaf comprised only of petiole or rachis.
 Pilose.--A soft, usually spreading, long pubescence.
 Pinnate.--An arrangement of leaflets or leaf blade lobes in two rows on opposite sides of a rachis or midrib.
 Pith.--The soft, mostly parenchymous, core of twig or stem.
 Placenta.--That part of the inner ovary wall that develops ovules.
 Plumose.--Producing fine, elongate hairs as does the pappus of some composites such as thistle.
 Pollen.--The product of reduction-division of the pollen mother cell in spermatophytes, usually resulting in a tetrad of small spores, later male gametophytes.
 Pollination.--The process of transfer of pollen from the anther to the stigma of a flower.
 Pollinium.--An agglutinated mass of pollen (as in orchids, milkweeds).
 Primocane.--The first wood of a shrub from which the flowering shoots, or floricanes, arise.
 Prismatic.--Angled-solid, with plane faces, as in a prism.
 Procumbent.--Axis growing flat over surface, not rooting at nodes.
 Proximal.--Axis end of an appendage.
 Puberulent.--A short pubescence.
 Pubescent.--Collective term for a hairy surface.
 Punctate.--Shallowly pitted.
 Pyxis.--Specialized capsule with circumsessile dehiscence.
 Quadrate.--Four-angled.
 Raceme.--An inflorescence longer than broad, with several pedicellate flowers, the pedicels subequal.
 Rachilla.--Central, often jointed, axis of spikelets or florets in many grass-like plants.
 Rachis.--Axis of compound leaf or compound inflorescence.
 Receptacle.--The floral axis.
 Recurved.--Apically curved or bent backward toward base.
 Reflexed.--Sharply recurved.

Regular.--Radially symmetrical; actinomorphic.
Relict.--Endemic leftovers from past geologic times.
Reniform.--Kidney-shaped.
Retorse.--Directed downward.
Retuse.--A shallowly notched, broadly rounded apex.
Rhizome.--An underground, often horizontally oriented, stem.
Rhombic.--With the outline of a rhombus.
Root.--Mostly underground organ with functions of support, anchorage, absorption, storage.
Rosette.--Arrangement of leaves when spreading from a basal, tightly spiralled attachment (i.e. dandelion).
Rostrate.--Beaked.
Rotate.--Radially symmetrical calyx or corolla with lobes longer than tube.
Rugose.--A wrinkled surface.
Runner.--A slender stolon.
Sagittate.--The shape of an arrowhead, with basal lobes directed outward and downward, acute.
Salverform.--Trumpet-shaped, as in the corolla of Phlox.
Samara.--A dry, indehiscent, winged fruit.
Saprophyte.--A plant without chlorophyll, feeding on dead plant or animal matter.
Scabrous.--A roughened, sandpapery, surface.
Scale.--Usually a modified leaf that is small and chaffy (i.e. bud scales, bracts in grasses and sedges).
Scape.--An elongate, leafless peduncle or flower stalk, often developing from a rosette (i.e. bladderworts, butterworts).
Scarious.--Thin, as in translucent fine paper.
Sciophyte.--An obligate shade plant.
Schizocarp.--A dry fruit splitting at maturity to one-seeded mericarps.
Scorpioid raceme.--A unilaterally coiled, usually zig-zag raceme.
Secund.--Unilateral arrangement of parts along an axis.
Seed.--A fertilized, ripened ovule.
Sepal.--The outer, usually most leaf-like, perianth; usually green, but sometimes colored as in petals.
Septate.--Cross-partitioned.
Septicidal.--Dehiscence so that carpel walls separate at the cross walls of the fruit.
Serrate.--A toothed margin in which teeth are directed upward, the lower side of a tooth longest.
Serrulate.--Diminutive of serrate.
Sessile.--Lacking a stalk, thus attached directly.
Sheath.--The tubular, stem-sleeving base of a leaf, bract, or perianth member.
Shoot.--An aerial stem or branch; a new branch or twig of a woody plant.
Shrub.--A woody plant, usually with numerous shoots from the groundline with diameter under four inches and lower than 15 feet.

Silicle.--A short, bicarpellate fruit whose septum persists after the valves have fallen (many mustards).

Silique.--An elongate version of a silicle.

Simple.--Referring to simple-bladed leaves; not compound.

Sinuate.--A margin that is wavy, as in the sine curve.

Sinus.--The interval between two adjacent lobes of a margin.

Soboliferous.--Producing numerous shoots from an underground base.

Solitary.--In reference to flowers, one that appears singly.

Sorus.--Sporangial cluster in ferns.

Spadix.--A fleshy spike, the flowers often sunken or basally embedded in the fleshy axis.

Spathe.--A single bract or fused bract compound that sheathes an inflorescence or inflorescence base.

Spatulate.--Blade outline in which the rounded apex tapers concavely to an elongate narrow base (as in the old-fashioned spatula.)

Spike.--A variously elongated inflorescence of sessile flowers.

Spikelet.--A small chaffy or papery-bracted inflorescence as in grasses or sedges; may be actually modified racemes or other sorts of inflorescence).

Spine.--A rigid, sharp outgrowth, modified from a leaf, leaf tip, leaf margin, stipule, etc., but essentially foliar; not to be confused with thorns which are modified shoots.

Spreading.--Appendages departing nearly at right angles.

Spinulose.--Short spines along margin.

Sporangium.--Spore case.

Spur.--The hornlike projection from base of anther (i.e. ericads), perianth (bladderworts, columbines, larkspurs).

Squarrose.--The margin toward apex of bract, leaf or other appendage abruptly spreading or recurved.

Stamen.--A single male unit of a flower, composed of filament, connective, anther.

Staminode.--A reduced, non-pollen-producing stamen.

Stellate--Star like.

Stem.--A leaf producing axis in vascular plants, usually producing leaves and buds at each node.

Stigma.--A variously dilated, branched, lobed, pollen-receptive zone of the gynoecium, usually at stylar apex.

Stipe.--A stalk.

Stipitate.--Stalked.

Stipule.--A leaflike appendage, spine or gland lateral to leaf base on some stems; may be persistent or deciduous.

Stolon.--A modified slender stem, the internodes long and arching, the nodes rooting.

Stomata--Epidermal pores through which gas exchange occurs.

Strigillose.--Stiff, short, subappressed pubescence.

Strigose.--Stiff, comparatively longer, subappressed pubescence.

Strumose.--Swollen-based, as in some stiffish hairs.

Style.--The narrowed sterile apex of an ovary, terminating in stigma tissue.

Stylopodium.--A disc-like tissue around the styler bases in many Apiaceae.

Succulent.--Fleshy, usually swollen with water.

Superior ovary.--Free base of ovary at or above level of other floral parts (hypogyny).

Suture.--Zone of union of carpels, usually marked by a ridge or groove; line of dehiscence.

Sympatric.--Overlapping geographic range of allied taxa in a genus.

Taproot.--A strong and dominant, usually plumb, primary root.

Tepal.--A perianth part superficially identical to all other perianth in a given flower.

Terete.--Round in cross-section.

Terminal.--An apical position in reference to shoot.

Ternate.--A three-palmate system of branching of compound leaves or inflorescences.

Throat.--Zone where limb and tube of calyx or corolla come together; orificial area.

Tomentose.--A surface densely covered by a mat of hairs, thus obscured, is tomentose

Tomentulose.--Having a fine tomentum.

Tree.--A woody plant, usually with distinct growth rings of wood, with one or few strong trunks having diameters of four inches or more and heights of 15 feet or more at maturity.

Triangular.--Three-angled in cross-section; trigonous.

Trichome.--Any plant hair.

Trifoliolate.--With three leaflets.

Tube.--Joined tubular bases of sepals and/or petals; hollow cylinder.

Tuber.--A contracted, swollen, food-storage branch, with numerous, often irregularly arranged buds or "eyes"; usually underground, rarely aerial (Dioscorea).

Tuberculate.--Surface beset with numerous small, narrow bumps (tubercles).

Tubular.--A hollow cylinder.

Umbel.--An inflorescence in which the pedicels or primary branches arise at a common level at peduncle or branch apex.

Undulate.--A wavy margin or surface.

Unifoliolate.--A compound leaf with but one leaflet.

Unisexual.--Of one sex only.

Urecolate.--Urn shaped.

Utricle.--A dry single-seeded fruit with a thin, bladdery pericarp.

Valvate.--In buds, when edges of scales meet but do not overlap.

Valve.--A unit of wall of a dehiscent fruit; a flap of anther wall tissue.

Velum.--The indusium in Isoetes.

Ventral.--The inner face of an organ or appendage relative to axis.

Verticil.--A whorl.

Verticillate.--A whorled arrangement.

Villous.--A covering of long, soft, straight hairs; a dense pilosity.

Weed.--A pioneer plant quick to occupy bare areas or disturbed soils, a poor competitor but with high reproductive potential; a plant out of place; a species known to be part of lower seral stages and which invades area intended by man to produce other species of known value.

Zygomorphic.--A floral form that has but one ideal plane of division.

Figure 1. Blade outlines or forms.

- | | |
|-----------------|-----------------------------|
| a. filiform | k. rhombic |
| b. linear | l. ovate |
| c. subulate | m. obovate |
| d. acicular | n. runcinate |
| e. lorate | o. pandurate |
| f. spatulate | p. deltoid (triangular) |
| g. lanceolate | q. obdeltoid (obtriangular) |
| h. oblanceolate | r. orbicular |
| i. oblong | s. orbicular |
| j. elliptic | t. reniform |

Figure 2. Blade margins.

- | | |
|-----------------------|--------------------------------|
| a. entire | m. pinnatifid (pinnate) |
| b. undulate | n. incised |
| c. sinuate | o. dentate |
| d. crenate | p. palmately lobed |
| e. crenulate | q. crispate |
| f. ciliate | r. pedately lobed |
| g. ciliolate | s. pectinate |
| h. serrate | t. fimbriate |
| i. serrulate | u. deeply lacerate (laciniate) |
| j. doubly-serrate | v. revolute |
| k. spinose (aculeate) | w. involute |
| l. denticulate | |

Figure 3. Blade apices.

- a. acute
- b. aristate (awned)
- c. acuminate
- d. caudate
- e. cuspidate
- f. obcordate
- g. retuse
- h. emarginate
- i. mucronate
- j. mucronulate
- k. cirrhous
- l. apiculate

Figure 4. Blade bases.

- a. acute
- b. attenuate
- c. oblique
- d. truncate
- e. cordate
- f. peltate
- g. auriculate
- h. hastate
- i. sagittate
- j. perfoliate
- k. connate-perfoliate

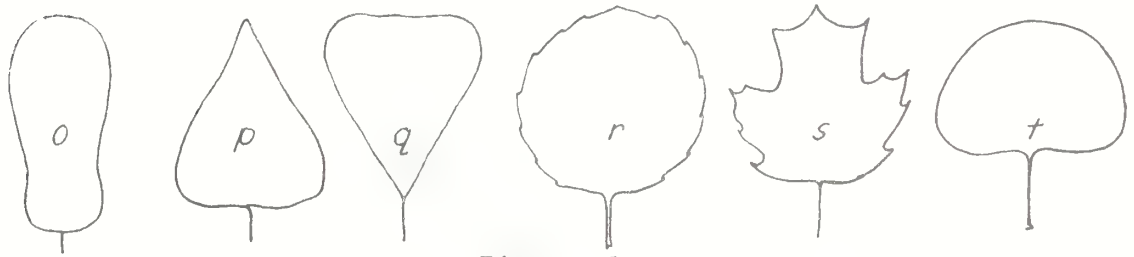
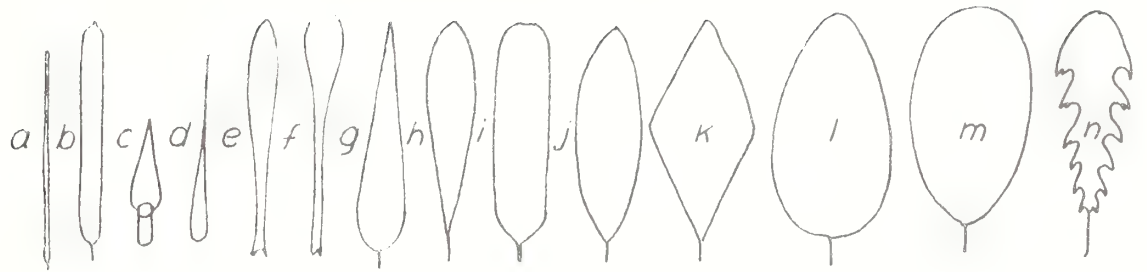


Figure 1.

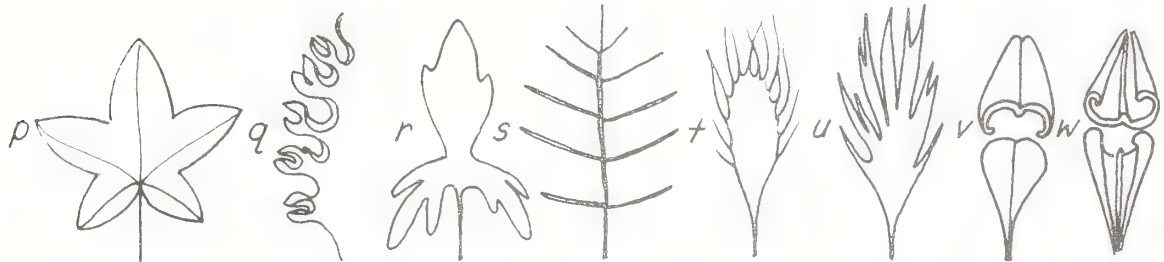


Figure 2.



Figure 3.

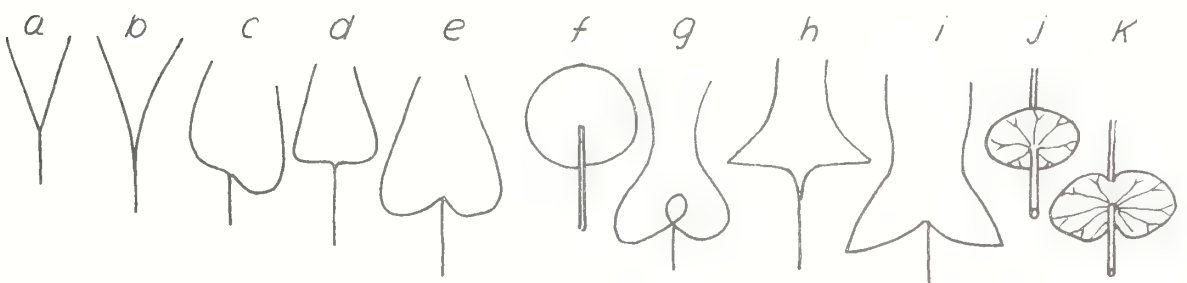


Figure 4.

Figure 5. Inflorescence types; corolla types.

- a. spike (indeterminate)
- b. raceme
- c. panicle
- d. corymb
- e. cyme
- f. spadix (subtended by spathe)
- g. catkin (ament)
- h. simple umbel
- i. compound umbel
- j. head (capitulum)
- k. scorpioid
- l. campanulate
- m. funnelform
- n. urceolate
- o. bilabiate (zygomorphic)
- p. salverform
- q. tubular
- r. rotate
- s. ligulate
- t. papilionaceous



Figure 5.

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SHRUB**Whorled-leaved rosemary**
(Conradina verticillata)

Family: Mint

Flowering date: May and early June

Habitat: Bars, bluffs and banks of streams and rivers in the Cumberlands

Identifying characters:

Stern square; leaves opposite; flowers zygomorphic with a deeply 4-lobed ovary.

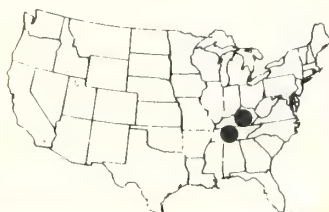
Stems woody; flowers borne in leaf axils; corolla tube strongly bent.

Leaf blades glabrous; calyx tube with long glandular hairs; lower corolla lip less than 10 mm wide and lateral lobes longer than wide.

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SHRUB**Spotless-petaled dicerandra**
(Dicerandra immaculata)

Family: Mint

Flowering date: September and October

Habitat: Fine white or yellow sands of ancient dunes near the southeastern coast of Florida

Identifying characters:

Stems square; leaves opposite; flowers zygomorphic with a deeply 4-lobed ovary.

Stems woody; flowers borne in leaf axils; corolla tube straight; anthers awned.

Shrubs; petals spotless.

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**SHRUB****Opposum pawpaw**
(Asimina tetramera)

Family: Custard-apple

Flowering date: May through October

Habitat: Sand scrub on the southeast coast of Florida

Identifying characters:

Trees or shrub; leaves simple with net venation; flowers hyogenous bisexual; sepals 3 to 4; petals multiples of 3 and free to the base; stamens with connective truncate tissue that overtops anther sacs; carpels 2 or more, separate.

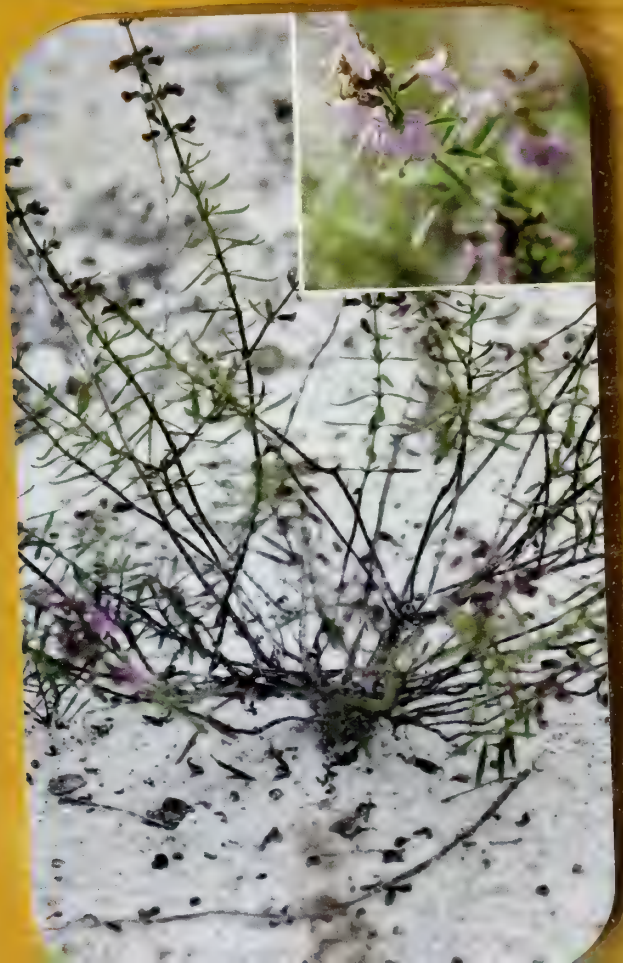
Receptacle hemispheric; petals 6 or less, oblong to ovate; anther sacs separate; fruit with smooth skin.

Stems greater than 1 m tall, glabrous; leaves coriaceous, oblong to oblanceolate; flowers arise from axil of new leaves, less than 3.5 cm broad.

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Heller's gay-feather (*Liatris helleri*)

Family: Aster

Flowering date: July through September

Habitat: Open rocky outcrops at high elevations of Blue Ridge Mountains

Identifying characters:

Flowers in involucrate heads; anther united, forming a tube; ovary inferior.

Stems erect; stem leaves entire, alternate and smaller than basal leaves; heads arranged in spikes containing only purplish disc flowers; involucre lacking spines or prickles.

Heads with 7 to 10 flowers, less than 1 cm wide; corolla including lobes less than 11 mm long, evidently hairy towards the base within; pappus barbellate, notably short and not reaching the sinus of the corolla tube.

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Blue Ridge goldenrod (*Solidago spithamea*)

Family: Aster

Flowering date: Late July to September

Habitat: Rock crevices at high elevation of Blue Ridge Mountains

Identifying characters:

Flowers in involucrate heads; anthers united forming a tube; ovary inferior.

Fibrous-rooted perennial herbs; leaves alternate and without oil glands; receptacle naked; heads radiate, small, less than 2 cm wide; involucre less than 1.5 cm long, imbricate and in several series; rays less than 5 mm long and more numerous than disc flowers; pappus of capillary bristles, simple and of 1 series.

Plants less than 4 dm tall; inflorescence corymbiform; rays yellow.

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Tennessee purple coneflower (*Echinacea tennesseensis*)

Family: Aster

Flowering date: Late June through July

Habitat: Open limestone glades of Tennessee.

Identifying characters:

Flowers in involucrate heads; anthers united forming a tube; ovary inferior.

Leaves alternate and entire; receptacle chaffy; heads radiate; the 6 or more ray flowers are greater than 2 cm long; pappus a short toothed crown; achenes quadrangular.

Stems softly hirsute; leaves softly hirsute, linear to lanceolate, 5 to 20 times as long as wide, attenuate to base; heads conical; rays purple, 2 to 4 cm long; achenes 3.5 to 5 mm long.

USDI Fish & Wildlife Service and National Park Service, USDA Forest Service, and Extension Service.

1981



TREE

309

Manac palm (*Calyptronoma rivalis*)

Family: Palm

Flowering date: November

Habitat: Along marshy streams in moist, limestone hills of Puerto Rico.

Identifying characters:

Trees or shrubs with plicate leaf blades greater than 3 dm wide; perianth petaloid.

Trunks solitary, less than 25.4 cm in diameter; leaf sheath closed at the base forming a conspicuous column and less than 0.7 m long; leaves pinnate, spineless and greater than 2.4 m long. Only one species in Puerto Rico.

USDI Fish & Wildlife Service and National Park Service, USDA Forest Service, and Extension Service.

1981



PUERTO RICO



W. Milstead

**FORB****213****Heller's gay-feather**
(Liatris helleri)

Family: Aster

Flowering date: July through September

Habitat: Open rocky outcrops at high elevations of Blue Ridge Mountains

Identifying characters:

Flowers in involucre heads; anther united, forming a tube; ovary inferior.

Stems erect; stem leaves entire, alternate and smaller than basal leaves; heads arranged in spikes containing only purplish disc flowers; involucre lacking spines or prickles.

Heads with 7 to 10 flowers, less than 1 cm wide; corolla including lobes less than 11 mm long, evidently hairy towards the base within; pappus barbellate, notably short and not reaching the sinus of the corolla tube.

USDI Fish & Wildlife Service and National Park Service, USDA Forest Service, and Extension Service.

1981



IDS

**FORB****216****1****Blue Ridge goldenrod**
(Solidago spithamea)

Family: Aster

Flowering date: Late July to September

Habitat: Rock crevices at high elevation of Blue Ridge Mountains

Identifying characters:

Flowers in involucre heads; anthers united forming a tube; ovary inferior.

Fibrous-rooted perennial herbs; leaves alternate and without oil glands; receptacle naked; heads radiate, small, less than 2 cm wide; involucre less than 1.5 cm long, imbricate and in several series; rays less than 5 mm long and more numerous than disc flowers; pappus of capillary bristles, simple and of 1 series.

Plants less than 4 dm tall; inflorescence corymbiform; rays yellow.

USDI Fish & Wildlife Service and National Park Service, USDA Forest Service, and Extension Service.

1981

**SHRUB****233****Panhandle rosemary**
(Conradina glabra)

Family: Mint

Flowering date: From March into June, then intermittently until frost

Habitat: Sandy, high, open, longleaf pine-scrub oaks woodlands

Identifying characters:

Stem square; leaves opposite; flowers zygomorphic with a deeply 4-lobed ovary.

Stem woody; flowers borne in leaf axils; corolla tube strongly bent.

Leaf blades glabrous; calyx tube glabrous; lower corolla lip less than 10 mm wide and lateral lobes longer than wide.

USDI Fish & Wildlife Service and National Park Service, USDA Forest Service, and Extension Service.

1981

**TREE****309****Manac palm**
(Calyptronoma rivalis)

Family: Palm

Flowering date: November

Habitat: Along marshy streams in moist, limestone hills of Puerto Rico.

Identifying characters:

Trees or shrubs with plicate leaf blades greater than 3 dm wide; perianth petaloid.

Trunks solitary, less than 25.4 cm in diameter; leaf sheath closed at the base forming a conspicuous column and less than 0.7 m long; leaves pinnate, spineless and greater than 2.4 m long. Only one species in Puerto Rico.

USDI Fish & Wildlife Service and National Park Service, USDA Forest Service, and Extension Service.

1981



PUERTO RICO





310 EVERGREEN TALL SHRUB

Vahl's boxwood (*Buxus vahlia*)

Family: Boxwood

Flowering date: Spring to fall

Habitat: Semi-evergreen, limestone forests of Puerto Rico

Identifying characters:

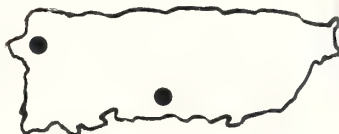
Flowers unisexual, perianth fused, corolla absent; placentation axile, ovules 2 per locule.

Erect, evergreen shrub, leaf margins entire.

Leaves oblong or obovate, less than 5 cm long, apex rounded; inflorescence 1 cm or less long.

USDI Fish & Wildlife Service and National Park Service, USDA Forest Service, and Extension Service.

1981



PUERTO RICO
and the VIRGIN ISLANDS



SHRUB 311

Fragrant Florida cereus (*Cereus eriophorus fragrans*)

Family: Cactus

Flowering date: April

Habitat: Coastal hammocks on high sand dunes

Identifying character:

Stem succulent, bearing spines; leaves reduced or lacking; flowers solitary and sessile; petals and sepals numerous, separate; stamens numerous, pistil 1, compound, inferior with partial placentation.

Stems cylindrical with ridges and grooves, lacking leaves and glochidium; flowers greater than 3 cm wide.

Stems round in cross section, reclining; floral tube greater than 3.5 cm long; hairs in areoles of floral tube 10 or more mm long; petals entire; berry obovoid.

USDI Fish & Wildlife Service and National Park Service, USDA Forest Service, and Extension Service.

1981



TALL SHRUB 312

Original prickly-apple cereus (*Cereus gracilis aboriginum*)

Family: Cactus

Flowering date: April to October

Habitat: Shell mounds and shore hammocks

Identifying characters:

Stem succulent, bearing spines; leaves reduced or lacking; flowers solitary and sessile; petals and sepals numerous, separate; stamens numerous; pistil 1, compound, inferior with parietal placentation.

Stems cylindrical with ridges and grooves, lacking leaves and glochidium; flowers greater than 3 cm wide.

Stems round in cross section; floral tube greater than 3.5 cm long; hairs in areoles of floral tube 8 mm or less long; petal apices erose - denticulate; berry depressed globose.

Young buds covered with brown hairs; berry dull yellow.

USDI Fish & Wildlife Service and National Park Service, USDA Forest Service, and Extension Service.

1981



SMALL TREE 313

Tree cactus cereus (*Cereus robinii*)

Family: Cactus

Flowering date: April to June

Habitat: Rocky hammocks

Identifying characters:

Stems succulent, bearing spines; leaves reduced or lacking; flowers solitary and sessile; petals and sepals numerous, separate; stamens numerous; pistil 1, compound, inferior with parietal placentation.

Stems cylindrical with ridges and grooves, lacking leaves and glochidium; flowers greater than 3 cm wide.

Stems round in cross section; flowers narrow campanulate; floral tube less than 2 cm long; berry naked and glabrous.

USDI Fish & Wildlife Service and National Park Service, USDA Forest Service, and Extension Service.

1981



J. Vivaldi



D. Austin



D. Austin



Robinson





314

LOW SHRUB**Puerto Rico senna**
(*Cassia mirabilis*)

Family: Legume

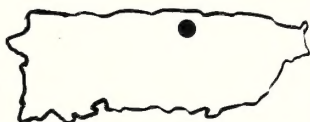
Flowering date: December

Habitat: Open, disturbed, sandy areas of
Puerto Rico

Identifying characters:

Flowers zygomorphic; pistil 1, simple;
fruit a legume.Leaves evenly 1-pinnate and without
tendrils at tip; leaflets 4 or more;
flower yellow, caesalpinaceous; pods
dry with a double wall.Low, prostrate shrub; leaflets 3 or
more pairs, 4 to 6 mm long, mem-
branaceous and finely veined;
stipules persistent; flowers 2 cm or
more wide; peduncles not longer
than the smallest leaf; calyx lobes
accuminate; pods not longer than
2.5 cm, 2 to 2.5 mm wide,
elastically deshiscent.USDI Fish & Wildlife
Service and National
Park Service, USDA
Forest Service, and
Extension Service.

1981



PUERTO RICO



315

FORB**Small-whorled pogonia**
(*Isotria medeoloides*)

Family: Orchid

Flowering date: Mid-May to Mid-June

Habitat: Open, dry, deciduous woods

Identifying characters:

Flowers zygomorphic; ovary inferior,
stamens situated on a column.Plants terrestrial; leaves smooth not
plicate, in a whorl of 5 or 6 leaves
terminating the stem and present at
flowering time.Stems greenish white; leaves
deflexed as the bud opens; pedi-
cles about 5 mm long.USDI Fish & Wildlife
Service and National
Park Service, USDA
Forest Service, and
Extension Service.

1981



316

FORB**Jones' pitcher plant**
(*Sarracenia rubra jonesii*)

Family: Pitcher-plant

Flowering date: April into early June

Habitat: Bogs, streambanks and seeps of Blue
Ridge Mountains

Identifying characters:

Flowering stem leafless; leaves pitcher-
shaped, hollow; stigma umbrella-
shaped.

Only one genus in the Southeast.

Leaves erect; hood flat, green,
more or less veined with purple;
corolla maroon.Solid portion of petiole one-
third the length of the leaf, abax-
ial portion of petiole flattened in
cross section; leaf tissue below
orifice thick, waxy and outer
surface glabrous; flowers about
equal to height of leaves.USDI Fish & Wildlife
Service and National
Park Service, USDA
Forest Service, and
Extension Service.

1981



317

EVERGREEN TALL SHRUB**Malabuey**
(*Goetzea elgans*)

Family: Nightshade

Flowering date: May to August

Habitat: Evergreen and semi-evergreen
seasonal forest of Puerto Rico

Identifying characters:

Leaves mostly alternate, estipulate;
corolla lobes fused, folded or contorted
rarely valvate in bud; ovary superior with
2 locules; placentation axile; fruit a cap-
sule or berry.Leaves elliptic, shiny with straight
parallel raised side veins; corolla 6-
lobed, orange, funnel-shaped and
nearly 1 inch long; berries orange.

Only one species in Puerto Rico.

USDI Fish & Wildlife
Service and National
Park Service, USDA
Forest Service, and
Extension Service.

1981



PUERTO RICO



W. Milstead



2
3
4



J. Vivaldi



W. Milstead

